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MONTANA FISH AND GAME DEPARTMENT ENVIRONMENTAL STATEMENT

ANNUAL STATEWIDE HARVEST OF BIG GAME ANIMALS

Project No. FG-22

Prepared in Accordance with
Environmental Impact Statement Requirements,
State and Federal

July 24, 1972--Game Division, Montana Fish and Game Department

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I. OBJECTIVE & PURPOSE

MONTANA FISH & GAME DEPARTMENTAL
ENVIRONMENTAL IMPACT STATEMENT
STATEWIDE BIG GAME HUNTING SEASONS

OBJECTIVE

The objective of big game management is to produce and maintain maximum breeding stock on all suitable lands in the State in harmony with other land use interests and to utilize the annual surplus by recreational hunting

PURPOSE

The intent of this Environmental Impact Statement is to thoroughly examine possible effects of the 1972 big game seasons on the environment within Montana. A further purpose will be to explore all reasonable alternatives and problems associated with big game seasons and to reach a conclusion which minimizes any adverse environmental impact. Finally, it will be the purpose of the Montana Fish and Game Department to present this statement to the public with the fullest possible participation.

II. DESCRIPTION OF PROJECT

DESCRIPTION OF PROJECT

Harvests of big game animals are obtained during annual hunting seasons set by the Fish and Game Commission under authority by law (section 26-104), Montana Fish and Game Laws. The commission legally describes, that during specified dates and specified areas, the taking of certain game animals in a described manner may be done by persons licensed to do so. The commission cannot, and does not, give persons authority to be on private, State or Federally owned lands. The only exceptions are those lands "owned," administered or controlled by the commission. It is the prerogative of a landowner or land-administering agency to prohibit trespass on their lands at any time. A licensed hunter must, by law, acquire permission from the landowner, lessee or their agents to enter on such lands.

When the fire danger becomes so extreme that the governor of the State of Montana, upon the advice and recommendation of the Montana State Forester, closes an area to trespass because of fire danger, that area shall automatically become closed to any hunting or fishing and shall remain closed so long as the fire closure remains in effect (section 26-345, Montana Fish and Game Laws). County Commissions can request fire danger closures through the state forester. The Montana Fish and Game Commission has authority to close hunting seasons on a 48 hour notice or by regulation.

The State of Montana is divided into seven supervisory districts, each of which is subdivided into hunting districts. These hunting districts are illustrated and legally described on the general and special season hunting maps published by the Department.

Season lengths, bag limits, opening dates and shooting hours are derived from various indices and management techniques. Types of seasons may vary with game population densities, access to areas, type of land ownership (private, State or Federal) and game depredation complaints. Essentially two basic types of season structure exist, the general season which accomodates deer, elk and bear hunters, and the special season which accomodates antelope, moose, sheep and goat hunters. Opening and closing dates of big game seasons as established for 1972 are presented in Table 1. The major portion of the hunters will be in the field between October 15, 1972, the opening of antelope season, and November 26, 1972, the closing of the general big game season. The early bear, elk and archery seasons and the special post-seasons constitute a minority of the total hunting populations.

The Montana conservation license is a prerequisite for purchase of all big game licenses. A specific license is required for each game animal pursued by the hunter.

The number of antelope, moose, sheep and goat licenses are limited and available on a drawing basis only (an exception is sheep hunting districts 301 and 501). Licenses for either sex elk hunts also are limited and controlled by drawing for some hunting districts. Restrictions on license numbers are imposed when the number of hunters must be limited for public safety and for restricting game harvest. There are no limitations on the numbers of licenses available for other big game species in Montana.

Special permit licenses, except for elk, require participants to: 1. Apply for drawings on or before July 1, 1972, 2. Applicant must not have killed a moose, ~~goat~~ or sheep in the past seven years, 3. If appli-

cant had a permit within last seven years but did not kill an animal he may make application by submitting his unused license, 4. antelope applicants who did not hold an antelope license the preceding year will be given preference in current drawings, and 5. no more than 10% of the total antelope, special elk, moose, sheep or goat licenses can be issued to non-residents by drawing.

TABLE 1. Opening and Closing Dates of Big Game Seasons as Established for 1972[1]

Date Open	Date Close	Season Type
March 15	Nov 16	Black Bear - Resident - $151 NR
May 1	Aug 31	Black Bear - $35 NR
Sept 15	Nov 26 - Districts 15, 280, 316	Grizzly Bear
Oct 22	Nov 26 - All other Hunting Districts	
Sept 9	Oct 14 - All Hunting Districts	Deer, Elk--archery
Sept 9	Nov 26 - Districts 260, 290	Deer only
Sept 10	Oct 14 - All Districts	Antelope--archery
Sept 17	Nov 12 - Districts 30, 31, 36	Antelope, limited permits
Oct 15	Nov 12 - All Other Hunting Districts	
Sept 15	Nov 26	Moose, limited permits
Oct 22	Nov 26	
Sept 1	Nov 26	Mountain Goat, both limited and unlimited permits
Sept 15	Nov 26	
Sept 1	Nov - Gallatin Area 301	Bighorn Sheep, both limited and unlimited permits
Sept 15	Nov 26 - All Other Hunting Districts	
Sept 15	Sept 19 - Designated Districts	Elk, early bull
Sept 15	Nov 26 - Districts 15, 280, 316	Elk, Early E.S.
Sept 24	Nov 26 - District 780	Deer, whitetail only
Oct 22	Nov 26 - Most Districts	Deer & Elk-regular
Nov 19	Dec 17 - Districts 41, 42, 424	Deer
Dec 3	Dec 10 - District 750	Deer, whitetail only
Dec 3	Dec 31 - Districts 62, 63	Elk, limited permits
Dec 8	Jan 14 - District 310	Elk, limited permits
Oct 22	April 30 - Entire State	Mountain Lion

1 The seasons listed are the general structure only, specific quotas, location of hunting districts can be obtained from detailed regulations published by the Department.

III. DESCRIPTION OF EXISTING ENVIRONMENT

DESCRIPTION OF EXISTING ENVIRONMENT

A. HUMAN RESOURCES

Montana's population is unevenly distributed with rugged mountainous areas in the west and plains areas in the east, having least numbers of people. People tend to cluster in valleys of the west and along major rivers in the east, Figure 1. The 1970 census reported 694,435 people, 47% and 53% being rural and urban, respectively. The average density was slightly more than four persons per square mile with 54% residing in seven counties, six of which are in western Montana (Montana Data Book, 1970).

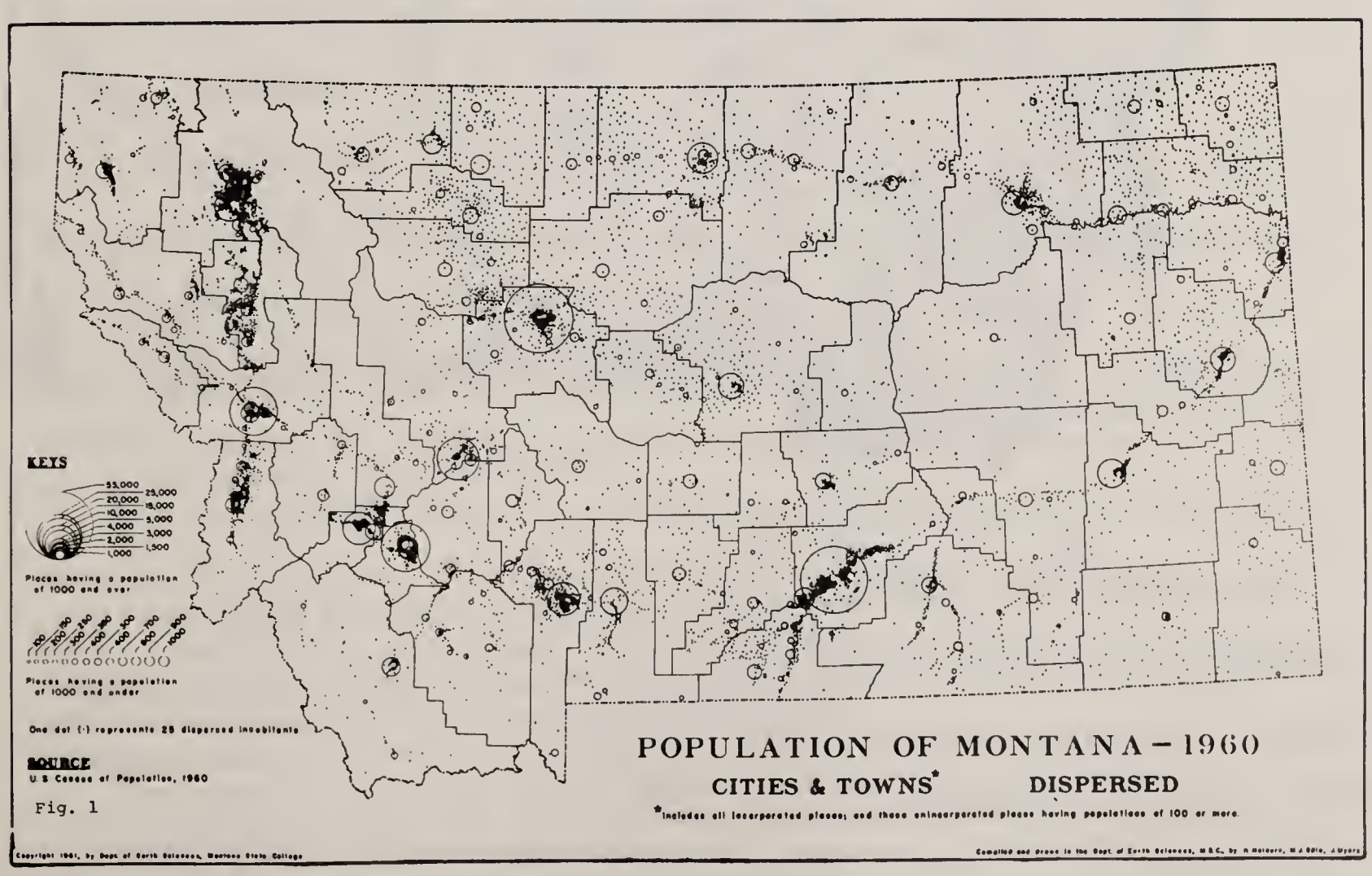


Fig. 1

Approximately 235,450 (34%) of Montana's residents participated in some form of hunting and/or fishing in 1971. About 135,000 (58%) of these hunted deer and elk. An additional 26,280 non-residents hunted some species of big game during 1971.

B. PHYSIOGRAPHY AND GEOLOGY

Montana is divided into three physiographic areas, Montane, Piedmont, and Midland, Figure 2.

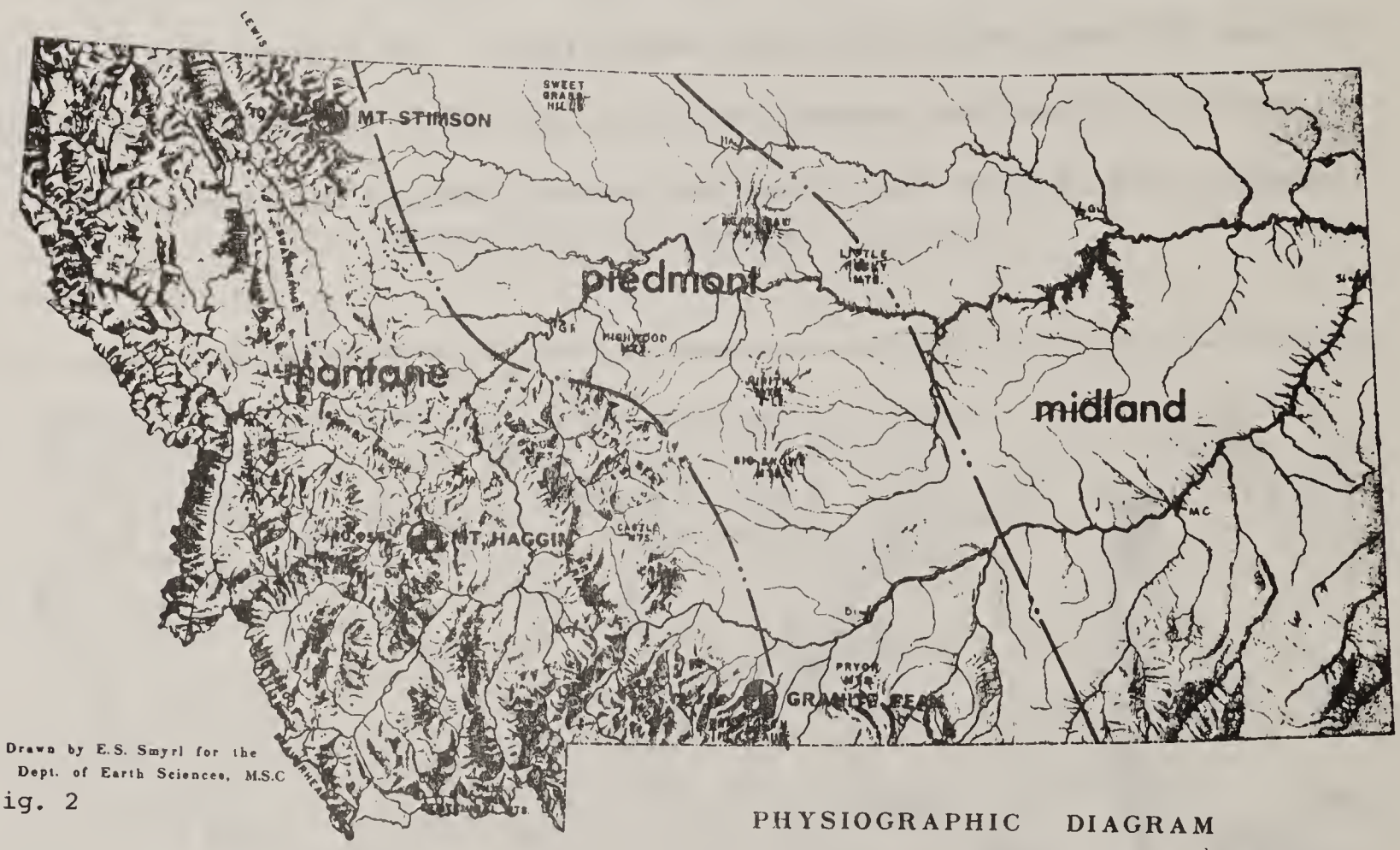


Fig. 2 PHYSIOGRAPHIC DIAGRAM

The western Montane is comprised of the Rocky Mountains which lie generally in a northwesterly direction as a series of high, parallel ranges. Within this rugged, generally forested region are found 25 or more ranges between which are located many basins and valleys the larger of which are 10 to 20 miles wide and 25 miles long. The highest elevation is 12,850 feet

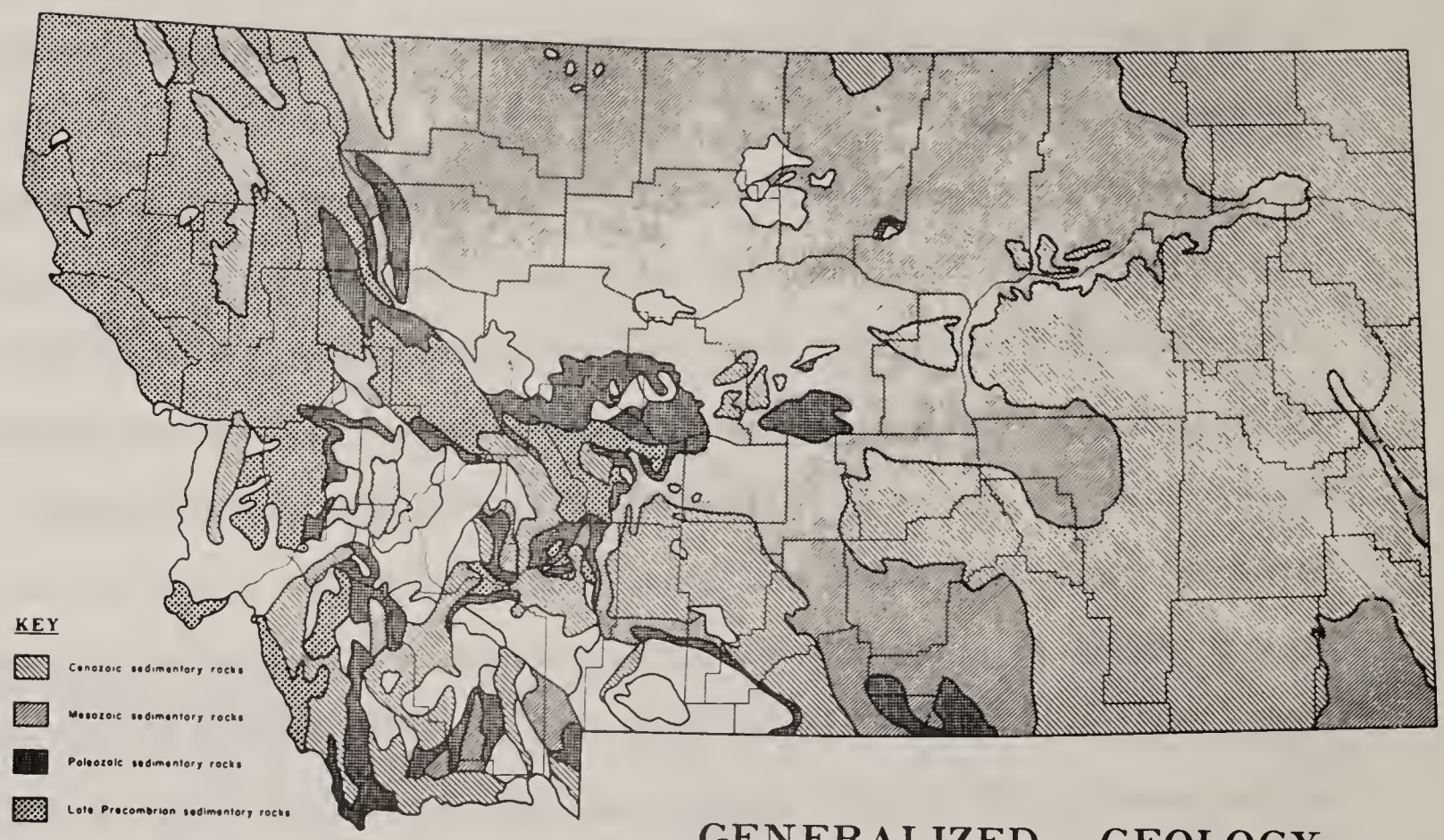
at Granite Peak in Park County near the southcentral boundary with Wyoming. In the Montane, elevation, climate, vegetation and soils change abruptly over short distances.

Stretching across the eastern 2/3 of the State are the Great Plains composed of the Piedmont and Midland areas. Commencing as broad Piedmont slopes more than 3,500 feet above sea level, the plains slope gently from the foothills of the Rockies toward the northeastern portion of the State where elevations as low as 1,900 feet occur along the Missouri River. Lesser mountain ranges that occur as islands within the plains occupy the Piedmont. Abrupt changes in soils are related to changes in elevation of mountains within the area. The relatively flat land of the Midland is an extension of the interior continental plains characterized by broad fertile valleys paralleled by back-stepped benches and bluffs. Changes in soil, climate, and vegetation are more gradual in the Midland area (Southard, 1969; Montana Almanac, 1959-1960).

Much of Montana is covered with sedimentary rocks (Figure 3) predominantly sandstone, siltstone and shale. All of eastern Montana is underlain by thousands of feet of sedimentary rocks, and in most places, lie nearly flat. Sedimentary beds of the Belt Formation, cover much of western Montana and are composed of argillite, siltites, quartzite and limestone.

The crystalline igneous rocks are largely concentrated in southwestern Montana (Figure 4) and contain many different materials of varying crystal size. The fine grained igneous rocks are composed of basalt and trachyte and coarse grained granite and quartz monzonite.

Metamorphic rock also occurs in southwestern Montana and consists largely of schist, gneiss and quartzite (Southard, 1969).



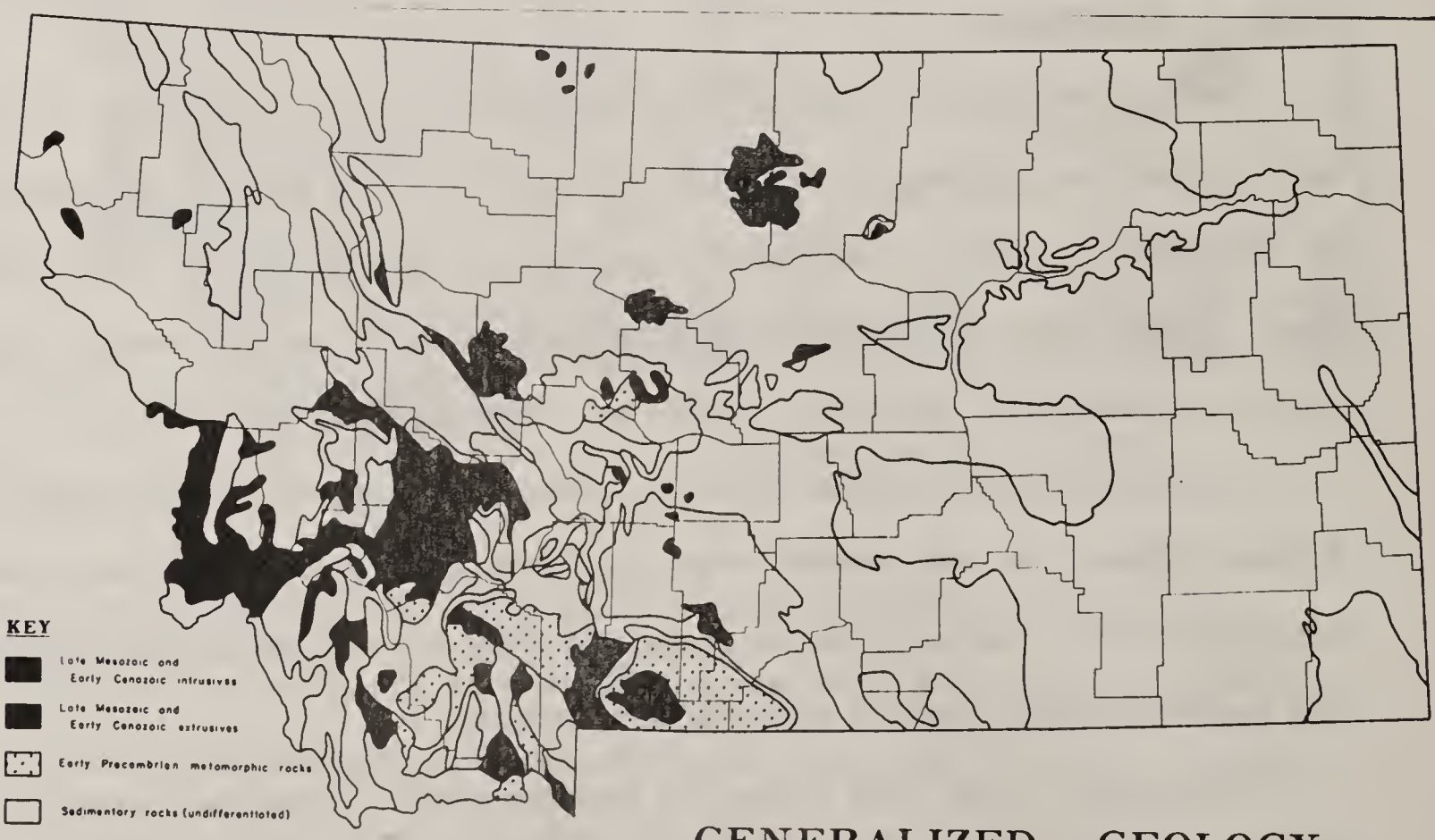
SOURCE

Geology modified from Geologic Map of the US (1932),

US Geological Survey, US Dept of Interior

GENERALIZED GEOLOGY SEDIMENTARY

Fig. 3


KEY
Late Mesozoic and Early Cenozoic intrusives
Late Mesozoic and Early Cenozoic extrusives
Early Precambrian metamorphic rocks
Sedimentary rocks (undifferentiated)

SOURCE

Geology modified from Geologic Map of the US (1932),

US Geological Survey, US Dept of Interior

GENERALIZED GEOLOGY CRYSTALLINE

Fig. 4

C. LAND USE AND OWNERSHIP

Approximately 92% (86.1 million acres) of land used in Montana generally falls in one of these classes; farming, ranching, grazing, timber, watershed management and recreation. The remaining 8% (7.5 million acres) makes up all "other lands" including waste land, water areas, highways and roads, and urban areas. Figure 5 depicts the types and distribution of major land uses in Montana (McConnen, 1962 and Thompson, 1956).

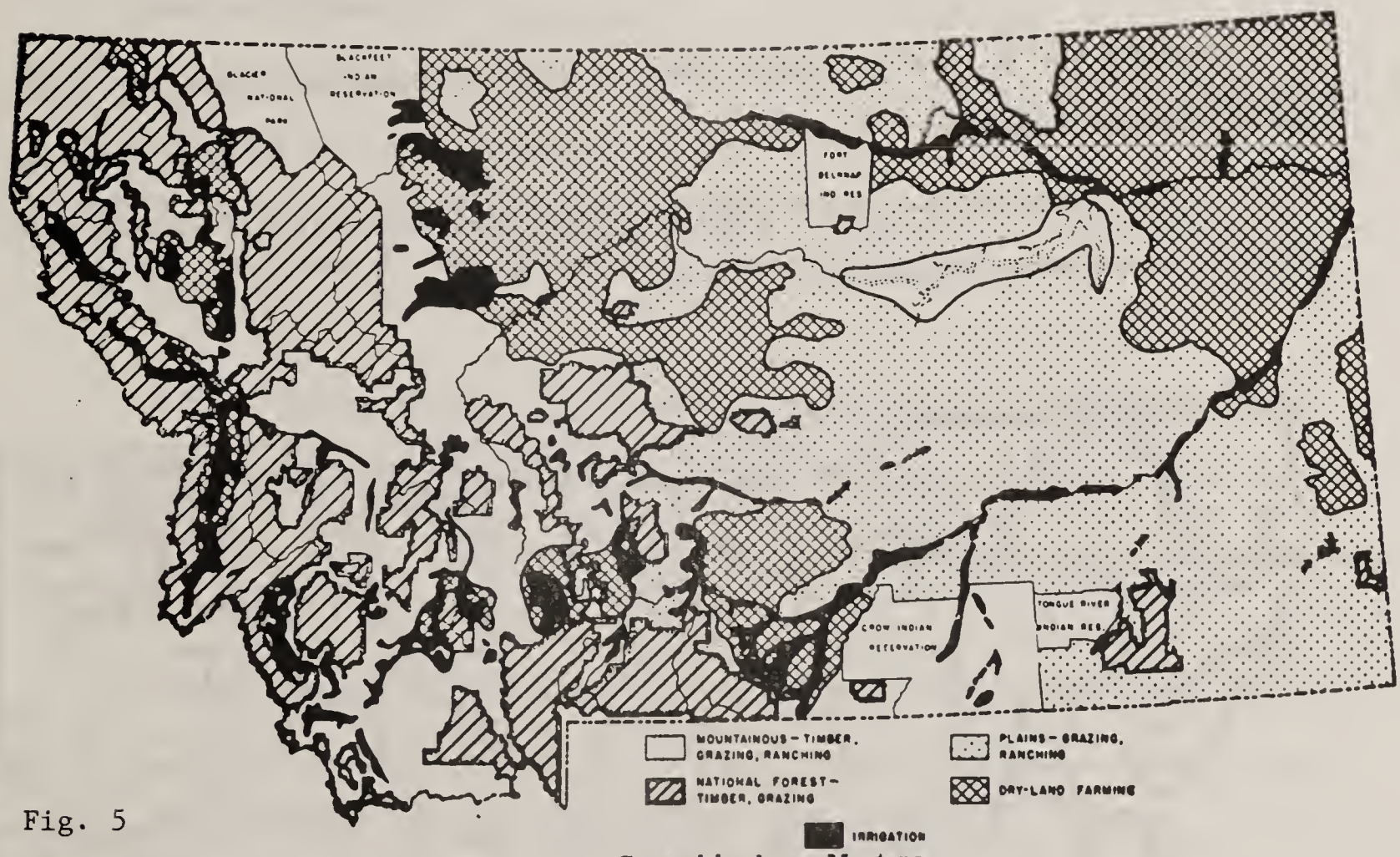


Fig. 5
General land use, Montana.

Agriculture is the leading land use activity over 60% of which is grazing. Likewise, agriculture ranks first as Montana's most important economic activity (Table 2). The two principle commodities are beef cattle and wheat. The mining-petroleum industry and manufacturing rank second and third ahead of outdoor recreations. The estimate of 145.5 million dollars

for outdoor recreation includes hunting, and fishing licenses, sporting equipment, lodging and meals, but not travel costs.

TABLE 2. Economic ranking of various industries in Montana for 1969.[1]

1.	Agriculture	$647.3 million
2.	Mining and Petroleum	$285.6 million
3.	Manufacturing	$207.5 million
4.	Outdoor Recreation (not including transportation)	$145.5 million
5.	Forest Products	$104.5 million

1 From Montana Department of Planning and Economic Development

Montana has a land ownership pattern like several other western states but different from other regions in the United States. A large portion is under public ownership. About 30% is owned, held in trust, or leased by the Federal Government (Figure 6, Table 3).

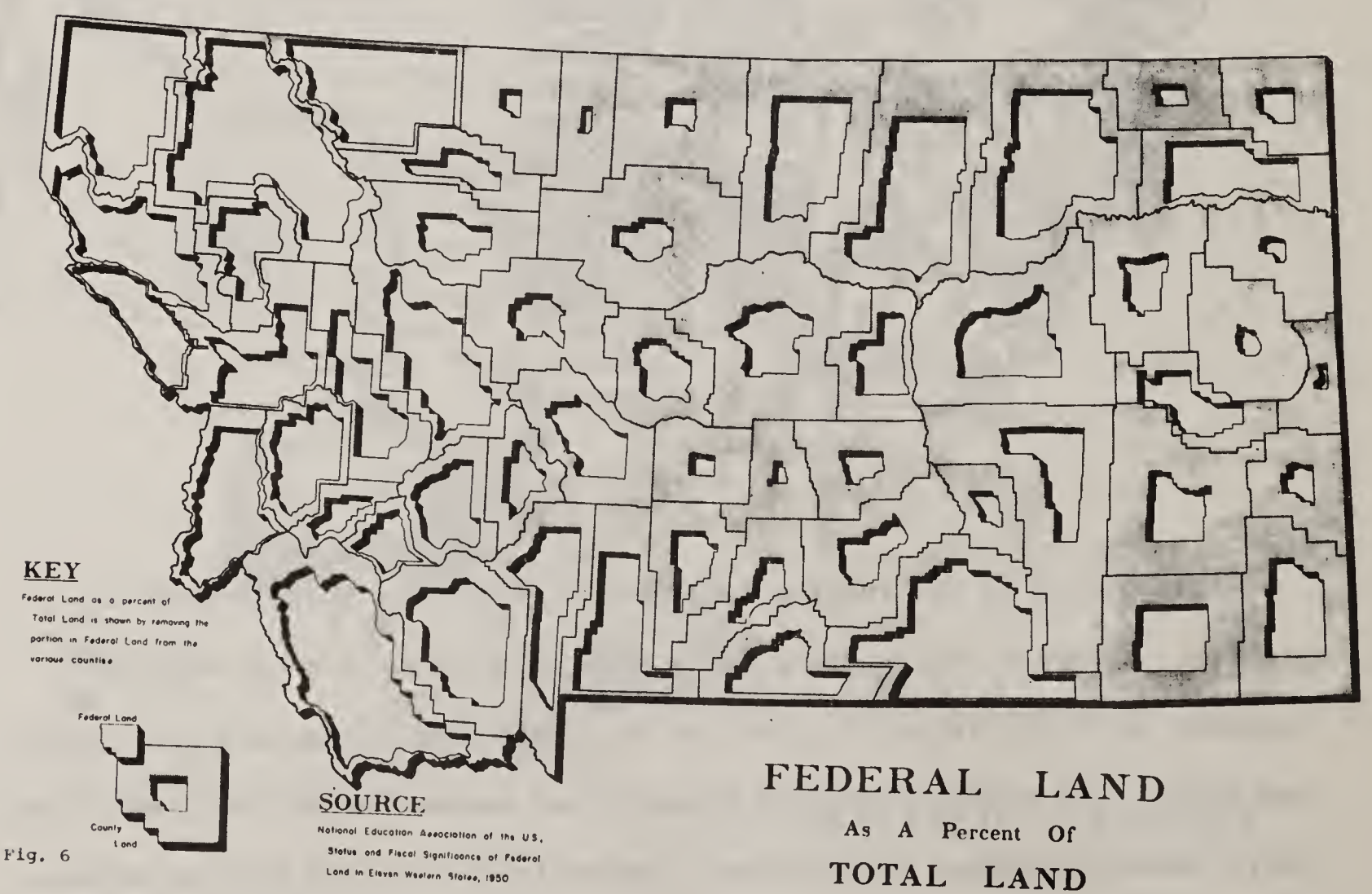

KEY
Federal Land as a percent of Total Land is shown by removing the portion in Federal Land from the various counties
Federal Land
County Land
SOURCE
National Education Association of the U.S. Status and Fiscal Significance of Federal Land in Eleven Western States, 1950
FEDERAL LAND
As A Percent Of
TOTAL LAND

Fig. 6

TABLE 3. Ownership of Land in Montana, 1970.[1]

Classification	Number Acres	
Federal Land		27,654,289
Forest Service	16,669,099	
Bureau of Land Management	8,217,414	
Bureau of Indian Affairs	125,473	
National Parks	1,154,766	
Bureau Sport Fisheries and Wildlife	497,379	
Other Federal	990,167	
State Land		5,231,724
Fish and Game Department	100,724	
Lands and Investment Department	5,131,000	
Private Land (includes Tribal)		60,385,027
STATE TOTAL		93,271,040

1 From: "One Third of the Nation's Land - A Report to the President and to the Congress by the Public Land Law Review Commission." Washington, D. C., June, 1970.

The U.S. Forest Service and Bureau of Land Management together administer nearly 25 million acres (27%) in various categories. State land is over 5 million acres (6%). ~~Thus, a large share of Montana is open for public use (Mussehl, 1971).~~

A large part of the State land, much of the land under Forest Service control, and practically all of the Bureau of Land Management land is used for grazing. Other uses include mining, lumbering, and recreation.

D. WILDLIFE - BIG GAME

No assessment of big game can be made without understanding that they are products of and dependent upon their environment or habitat. Since the quality and quantity of big game is determined by their habitat, population status merely reflects habitat status.

1. *Mule Deer*

There are few areas in Montana, either from the standpoint of topography or vegetation, where mule deer cannot be found. They occur more than just casually from Yaak to Alzada and from Monida to Westby and on almost every square mile in between. They are found at all elevations from under 3,000 feet on sagebrush flats in eastern Montana to over 8,000 feet in western Montana. They seem to be equally at home in the ponderosa pine forests of southeastern Montana and the spruce forests of northwestern Montana. River bottoms, badlands, high mountains and rolling foothills are all home for mule deer.

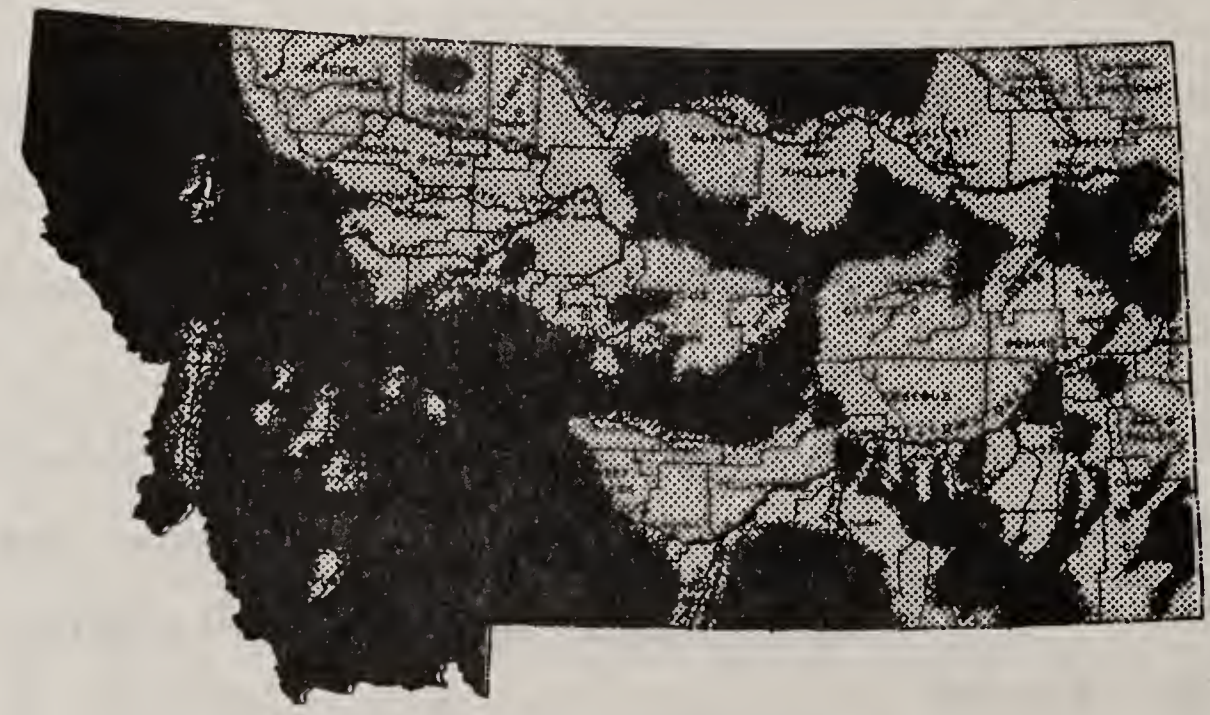


Fig. 7 Mule Deer Distribution

In general, mule deer prefer rather open type country containing adequate food supplies interspersed with escape cover of moderate to heavy timber, aspen groves, brushy draws and coulees, or the "breaks" along the Missouri River and "roughs" of eastern Montana.

Browse and weeds (forbs) are the mule deer's primary food. Plants that must be present in a healthy condition for a large deer population vary only slightly from one end of the State to the other. Main browse plants are mountain mahogany, bitterbrush, chokecherry, serviceberry, common and creeping juniper, mountain maple, evergreen and red stemmed ceanothus, big and fringed sagebrush, silver sagebrush, skunkbrush, rabbitbrush and dogwood. Several other browse plants may be used under certain conditions. The above named plants constitute only a small part of the total number of brush-type plants that grow in Montana, indicating that not all brush is good deer food (Egan, 1971).

2. *Whitetail Deer*

Fig. 8 Whitetail Deer Distribution

Every county now has at least a small population of whitetail deer. West of the Divide the largest concentrations are in northwest counties.

East of the Divide whitetails occur along bottomlands of most rivers and streams and also mountainous habitat including the Bear Paw Mountains in Blaine County, the Long Pines in Carter County and the Judith and Snowy Mountains in Fergus County. The latter presently supports the largest population east of the Continental Divide.

Habitat occupied by whitetail deer differs greatly west and east of the Divide. West side whitetails are usually found in closed canopy Douglas fir-ponderosa pine forests with the number of deer dependent on the amount of edge and low-growing browse on winter ranges. Typical whitetail winter range is a Douglas fir-ponderosa pine type on south or southwest exposures where fir thickets provide both cover and browse. Important browse often is a combination of serviceberry, chokecherry, snowberry, maple, kinikinnick and Oregon grape. Juniper and bitterbrush are locally important. Plants such as ninebark, ocean-spray and russet buffalo berry are often present but seldom used.

East of the Divide, whitetails are usually associated with the deciduous vegetation growing on bottomlands along drainages, often close to agriculture. Vegetation on these bottoms generally includes a combination of ash, box elder, cottonwood, willow and associated shrubs, forbs and grasses. Preferred browse plants include chokecherry, serviceberry, skunkbrush, snowberry, and dogwood. Other browse plants include rose, green rabbitbrush, greasewood, buffalo berry and various species of sagebrush. Another important habitat type, the Long Pines of southeastern Montana, is an isolated area of relatively open ponderosa pine scattered over rugged terrain. Fingers of deciduous trees extend from pine stands into surrounding prairies. Preferred browse plants are similar to those on river

bottoms (Allen, 1971).

3. *Pronghorn Antelope*

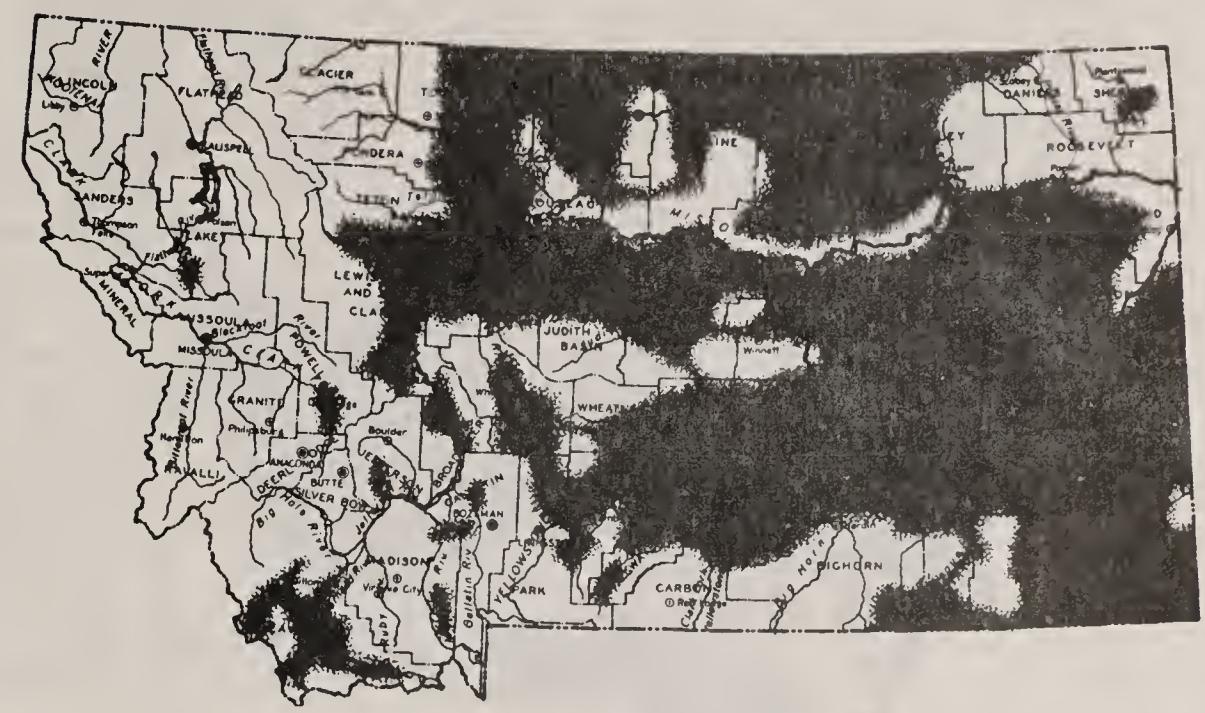


Fig. 9 Pronghorn Antelope Distribution

Pronghorn antelope are widespread in the eastern non-forested two-thirds of the State. They occupy most prairie habitats but require specific vegetation types during various seasons. Optimum habitat consists of open rolling sagebrush grasslands relatively free of human encroachment.

The sagebrush-grassland type generally receives about 50% of year-round use. Most use occurs in winter when antelope feed extensively on various sagebrush species. Types such as cropland, meadow and grassland receive little or no use during this period.

During summer antelope utilize a diversity of types with concentrations on mesic sites located in depressions and/or along creek bottoms. Preferred succulent vegetation persists longer on these types than on dry uplands where the sagebrush-grassland type occurs. Important forage plants

in summer include fringed sagewort, longleaf sagebrush, three-leaved milkvetch, alfalfa and yellow sweetclover (Compton, *et al.*, 1971).

4. *Elk*

Fig. 10 Elk Distribution

Elk are distributed in most mountainous and forested portions of the State from the arid Missouri River Breaks to the moist forests of northwestern Montana. Large blocks of undeveloped public lands provide requirements for major herds. Their habitats are classified as browse ranges and grass ranges on the basis of winter food availability. Browse ranges predominate in heavily forested areas of western Montana. There is a gradual transition in plant composition from western browse ranges to east slope grass ranges. Major forage plants on browse ranges include willow, ceanothus, maple, serviceberry, chokecherry, and sedges. Major forage plants on grass ranges are Idaho fescue, bluebunch wheatgrass and rough fescue (Rognrud and Janson, 1971).

5. *Moose*

Fig. 11 Moose Distribution

Moose are common in the northwest and southwest portions of the State. Although moose are generally associated with the willow-aquatic habitat type they occupy many other areas with different vegetation types. Major drainages such as the Flathead, Bitterroot, Big Hole, Ruby, Madison and the Gallatin support many moose. Likewise the spruce-fir forests, Douglas fir forests and deciduous forests types may support resident populations. Moose adapt their food habits to browse available in the various habitat types. At higher elevations, low huckleberry, willow and subalpine fir are most important. At lower elevations, Douglas fir, dogwood, service-berry and chokecherry may form the bulk of the diet. Where available, willow is important to moose (Stevens, 1971).

6. *Mountain Goat*

Mountain goats are found in rugged areas of major western mountain ranges and in comparable areas of isolated mountain ranges.

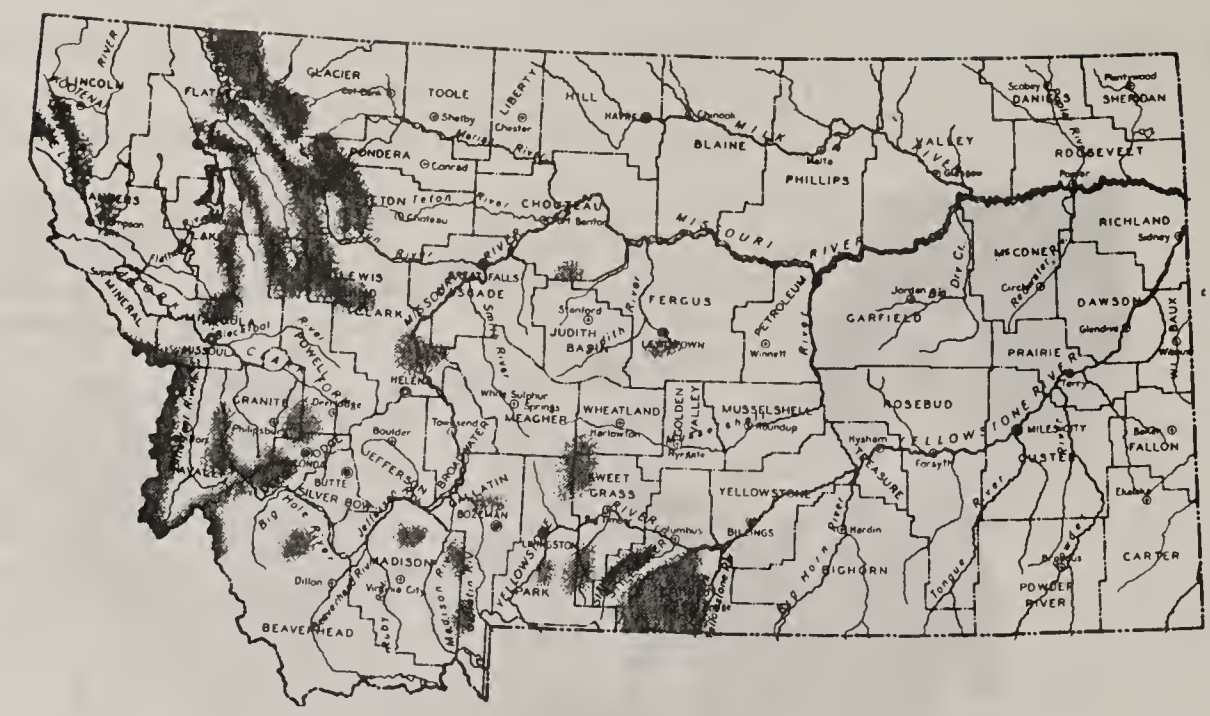


Fig. 12 Mountain Goat Distribution

Goats inhabit rugged terrain often showing well-defined evidence of glaciation. In Montana, goat ranges lie between 5,000 and 11,000 feet elevations. Goats tend to make use of higher areas during summer and move to lower elevations for winter. The reverse has been observed in some locations where they move up in winter to forage on slopes exposed by wind action.

At elevations inhabited by goats, vegetative growth is dwarfed due to the short growing season and cool temperatures. Cliffs and steep rock slopes, typical of goat ranges, produce little forage.

Food habit studies show grasses and grass-like plants are used year long and are most important in fall and winter. Forbs are most important during summer. Shrubs are used most during winter and spring. In some areas shrubs are important during summer (Foss and Rognrud, 1971).

7. *Bighorn Sheep*

Bighorn sheep distribution in Montana is spotty with 11 major native herds isolated to remote unsettled areas. Thirteen other areas have been

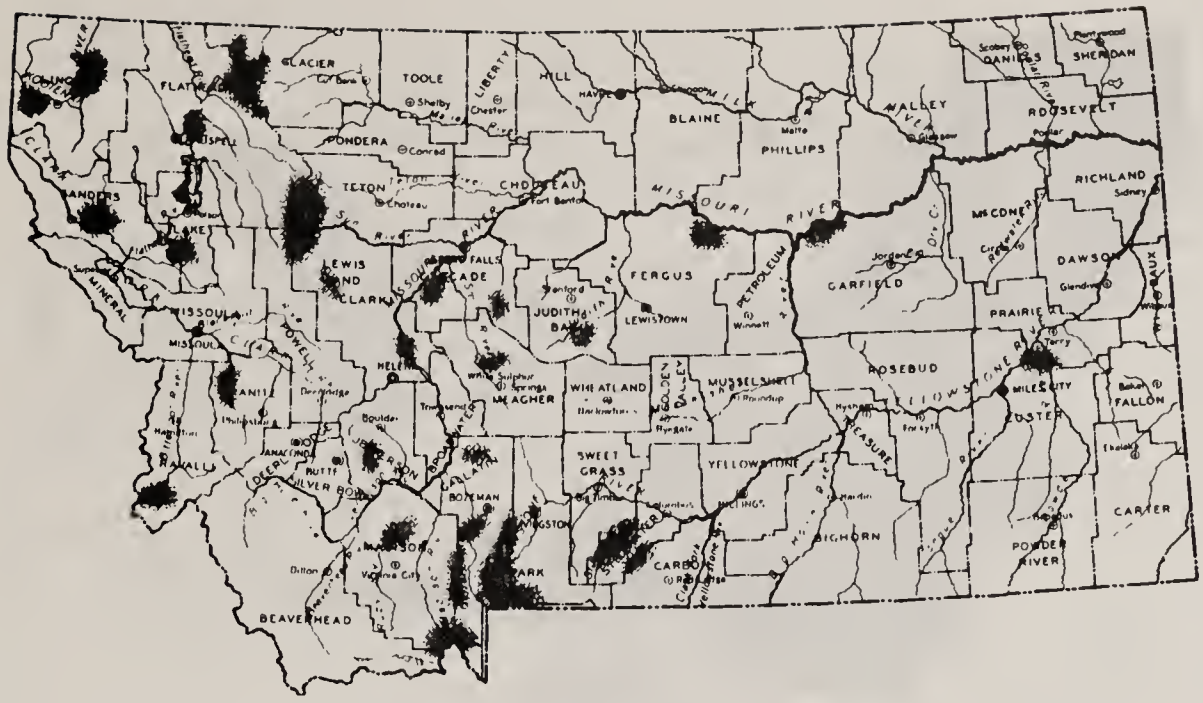


Fig. 13 Bighorn Sheep Distribution

stocked by transplanting with variable results.

Ideal habitat is composed of rocky ledges and walls for escape cover interspersed with open slopes for feeding. These types are occupied at varying elevations during all seasons. Scarcity of similar unoccupied habitats and competition with domestic and wild animals in other habitat types limits bighorn to their present distribution.

Palatable browse plants, forbs and grasses are all used for food during all seasons. Important plants include: browse--willow, buckbrush, skunkbrush sumac, chokecherry and western serviceberry; forbs--aster, arrowleaf balsamroot, silky lupine, milkvetch and common salsify; grasses--bluebunch wheatgrass, Idaho fescue, bluegrasses and giant wildrye (Couey and Schallenberger, 1971).

8. *Black Bear*

Montana has a sizeable population of black bear in much of the timbered portions of the State. Their habitat is continuous from western Montana to the wooded foothills east of the Continental Divide. Black bear are found

Fig. 14 Black Bear Distribution

in a few isolated mountain areas east of the Divide. They are found in a variety of forest habitats varying from open ponderosa pine to spruce-fir forests.

In northwestern Montana bears inhabit spruce-fir areas during the entire year, but make seasonal use of other habitats whenever certain foods become abundant. They appear to thrive best wherever human habitation, logging or agriculture have not significantly altered their environment. They avoid logged areas which have been clearcut until regrowth of brush and conifers takes place. Similar behavior is displayed in other forest habitat types in other parts of the State.

Black bears eat a variety of grasses, sedges and forbs as soon as they emerge from their winter dens. Fruits, pine nuts and berries are an important part of their diet during late summer and fall. They sometimes kill animals, eat carrion, or feed in garbage dumps, especially in early spring or late fall (Weckwerth, 1971).

9. *Grizzly Bear*

Fig. 15 Grizzly Bear Distribution

Montana, with the exception of Alaska, has the largest remaining grizzly bear population in the United States.

Grizzlies are found in the more remote forested regions of the State. These areas include Glacier National Park, Yellowstone National Park, the Flathead and Kootenai National Forests and remote areas such as the Mission Mountains, Absaroka Mountains, Cabinet Mountains, Bob Marshall Wilderness Area and a few other isolated areas. The largest huntable population is found in the Bob Marshall Wilderness which encompasses almost one million acres in northwestern Montana. Grizzly bears are not compatible with increasing human population, and their habitat in Montana is constantly being reduced.

Important components of the overall mountain habitat for grizzlies include rock slides, alpine meadows and heavy timber. Snowslide areas are especially important sources of early spring foods. Alpine meadows are

used in late summer by grizzlies feeding on vegetation and rodents. Heavily timbered areas furnish security and fall foods such as berries and white-bark pine cones. Grizzlies are opportunists and will eat almost anything. Grasses and sedges probably make up a large portion of their diet, but they will eat carrion, fruits, pine nuts, roots and other animals (Weckwerth, 1971).

10. *Mountain Lion*

Mountain lions are most common in rough timbered terrain of the west but occur in similar isolated areas of central and southeastern Montana. Its far-ranging habits and territorial behavior precludes dense populations. Large rough uninhabited blocks of land having sizeable deer and/or elk populations, such as the Sun River, support the largest huntable populations.

Deer and elk comprise the greatest share of the lions' diet. Snowshoe hare, marmots, porcupines and other small mammals and some vegetation comprise the remainder (Hornocker, 1970).

Except in a general way, mountain lion distribution is not known.

E. VEGETATIVE RESOURCES

It is not within the scope of this report to describe in detail the diversity of vegetation in Montana. A general description of the distribution of major vegetative types is presented. Seven broad types have been recognized (Figure 16). The forest type occupies 1/4 of Montana's area, most of which occurs in the west. Thirteen million acres of forest lie west of the Continental Divide and 9 million east (Montana Almanac 1959-1960). Western forest tend to dominate over large blocks of land whereas

in the east they occur as a series of islands or patches. The unforested portion of the State is predominantly grassland or grassland-shrub mixtures. A classification consisting of five types (Morris, 1959) is presented.

The northeastern Montana range is characterized by needle and thread grass and bluestem wheatgrass and is one of the best ranges in the State.

To the west and south is located the largest range area in the State. It contains the State's most common range type--the mixed prairie range. This includes needle and thread grass, bluestem wheatgrass and grama grass. Grama and needle grass are more common on the coarser soils while wheatgrass is abundant in the coulees, valley bottoms, and on the more clayey uplands.

The grama grass type is found in areas of approximately 12 inches of precipitation in central Montana. A large section of blue grama range is found between Cut Bank and Havre and north to the Canadian line. Extending from Miles City westward for many miles is another area of blue grama country. True buffalo grass is found mainly southeast of Miles City.

The bunch grass range begins in the foothills along the eastern edge of the Rocky Mountains, and includes the mountain valleys of the Missouri and the Columbia drainage systems, and the dry open slopes and ridges in the forests. Bluebunch wheatgrass, needle and thread grass, and native blue grass are common on the drier and lower slopes. Idaho fescue and rough fescue are important on the better soils and at higher elevations.

Sagebrush range is found in all sections of Montana. Silversage is abundant in valley bottoms of eastern Montana such as the lower Yellowstone. Big sage forms large types on heavy soils in the Little Missouri country

KEY
Undifferentiated stream bottoms and intermountain valley, grassland and meadow.
Forest and alpine grassland.
Eastern Montana pine forest and savannah.
Foothill grassland and sagebrush
Sagebrush and saltbush
Undifferentiated grassland
Prairie County grassland

SOURCE

Vegetative Rangeland Types in Montana, Montana Agricultural Experiment Station, Bozeman, Montana, 1949.

Fig. 16

VEGETATIVE TYPES

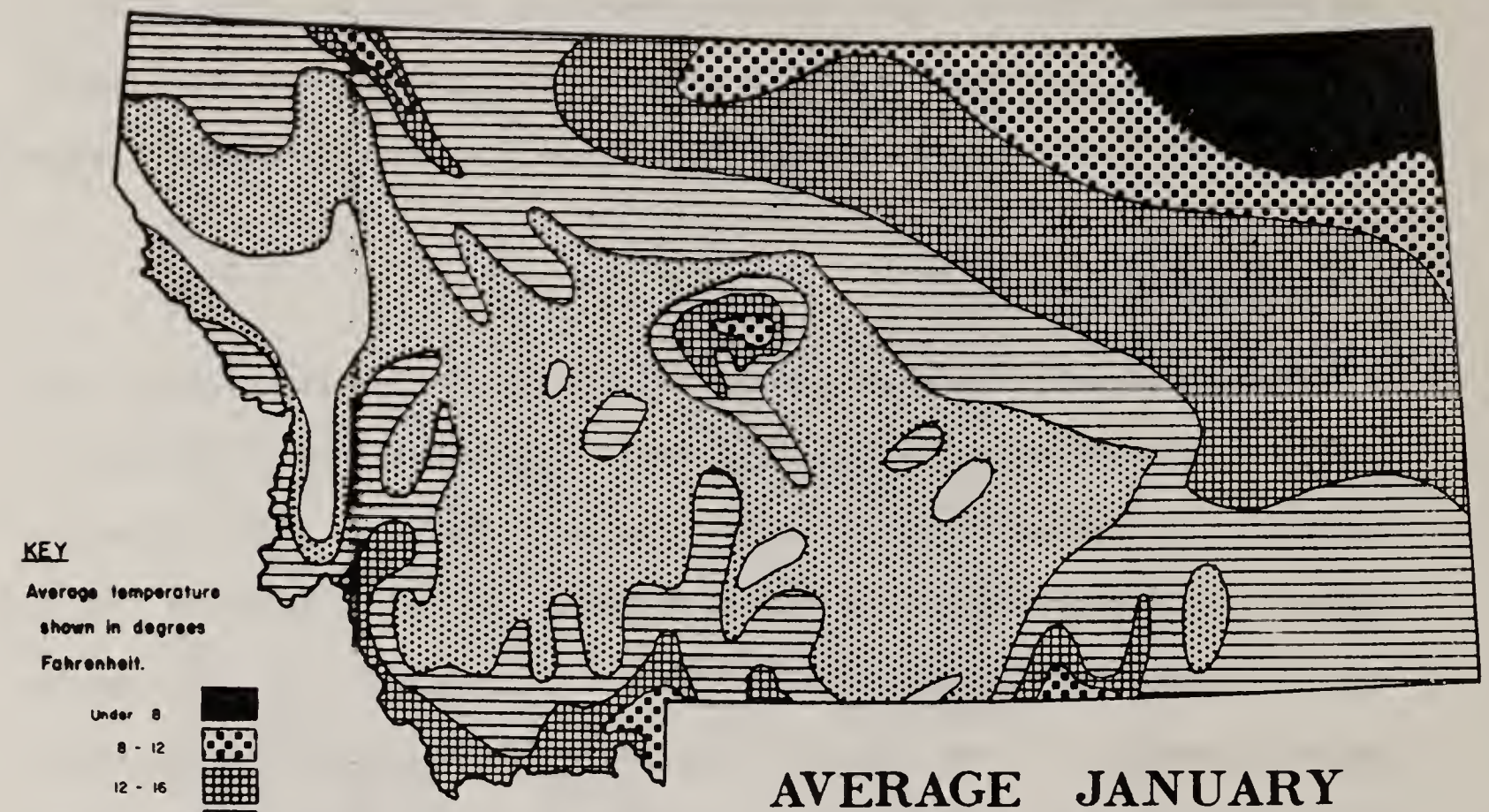
and northwest of Miles City. A large sagebrush region is found in the area between a line running from Roundup to Winifred and the Musselshell River. The upper Missouri and the Smith River drainages are largely sagebrush range.

F. CLIMATE

Montana's large area and great differences in elevation result in a highly diverse climate. While the lowest temperature recorded in the United States (minus 70 degrees F.) occurred in Montana, temperatures in excess of 100 degrees F. have been many times recorded at Montana stations. These extremes are unusual however. Actually, Montana's climate compares quite favorably with ~~the~~ New York City-Boston-Chicago ~~metropolitan~~ region, because Montana's average weather, although slightly colder, is far less humid.

Within the State, weather varies greatly from region to region. The Continental Divide breaks the State into two parts, each dominated by a different air mass. Weather in eastern Montana is largely influenced by cool or cold dry air from northern Canada and the western part of the State, by moist Pacific maritime air. The result is an average January temperature below 20 degrees Fahrenheit in most of the eastern part of the State and around 20 degrees in practically all of the west. In July, the effect is somewhat reversed in the west, while in eastern Montana effects of long hot days and the more interior continental location keep temperatures at a generally higher level (Figures 17 and 18).

Annual precipitation in Montana illustrates the State's generally dry climate. Approximately half of the State receives less than 15 inches of precipitation a year; the western part receives more moisture than the



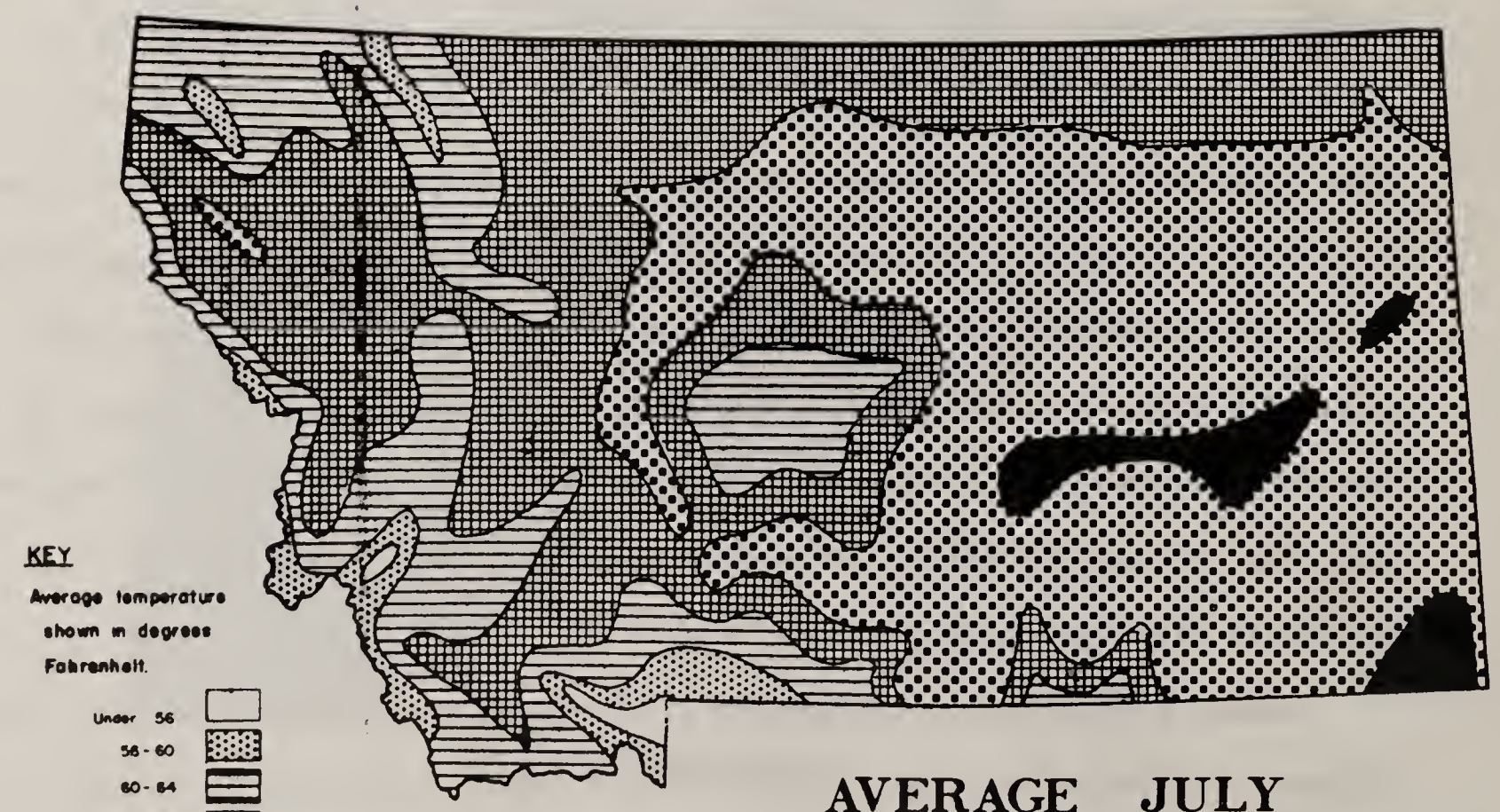
AVERAGE JANUARY TEMPERATURE

SOURCE

USDA, Climate and Man

USDC, Bull. W and Supp. 11-20

Fig. 17



AVERAGE JULY TEMPERATURE

SOURCE

USDA, Climate and Man

USDC, Bull. W and Supp. 11-20

Fig. 18

eastern because Pacific air masses lose much moisture over the western mountainous portion of the State, (Figure 19). The eastern part receives most of its annual precipitation from summer thundershower activity, while a larger portion of the total precipitation in the west comes in the form of snow during winter (Montana Economic Study Part I, 1970).

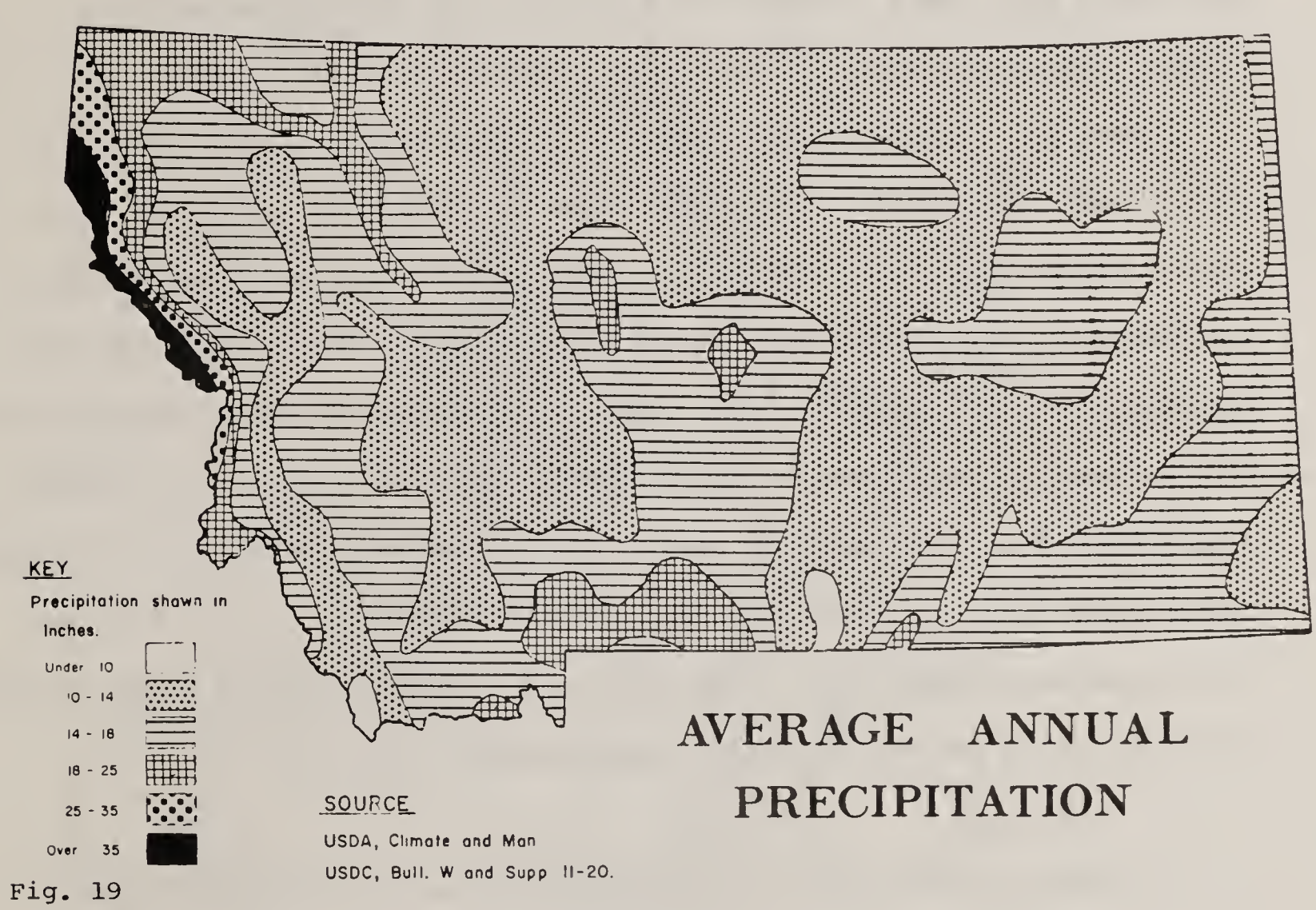


Fig. 19

Except for a few areas of especially high elevation, Montana generally falls in the 30 to 60 inches of snow range.

G. TRANSPORTATION SYSTEMS

Because of Montana's size and its remoteness, transportation is a problem. Residents are penalized economically by transportation problems resulting from the State's geographic location and the small number of

people in relation to land area. The inadequacy of public transportation, combined with the great distance involved explains the greater use of automobiles and private planes (Montana Economic Study Part II, 1970).

1. *Highways, roads and streets*

Montana's highways, roads and streets are used by private automobile operators, and common contract and private truck and bus operators. Montana has approximately 112 miles of road for each ~~100~~ 1,000 people.

There are 77,919 miles of roads in total of which 75,540 (97%) are rural roads and highways, and 2,379 miles are city streets; 30,289 miles and 11,000 miles of the total roads are graveled and paved, respectively. The remaining are dirt roads. About 1,600 miles of the city streets are paved and 750 miles gravel and/or dirt. The interstate system (Figure 20) extends east to west from the Montana-North Dakota border to the Montana-Idaho State line, and north to south from the Canadian border to the Montana-Idaho State line. A branch extends from the east-west route at Billings to the Montana-Wyoming State line, Figure 20 (Montana Highway Dept. Division of Planning and Survey, personal communication).

2. *Railroads*

In March of 1970, three of the major railroads in Montana, Great Northern, Northern Pacific, and Burlington merged to form the Burlington Northern, Figure 21. Excluding the U.S. Government line at Fort Peck, six railroads now operate in Montana, three being locals with less than 100 miles of road. The Burlington Northern and Chicago, Milwaukee, St. Paul and Pacific constitute the majority of the system. Each of the railroads are outlets for freight only, with major commodities including cereal grains, lumber and minerals. Tonage-wise, coal is the leading export.

LINCOLN
GLACIER
TOOLE
LIBERTY
HILL
PHILLIPS
VALLEY
DANIELS
SHERAN
FLATHEAD
PONDERA
BLAINE
ROOSEVELT
SANDERS
TETON
CHOUTEAU
RICHLAND
LAKE
McCONE
DAWSON
MINERAL
LEWIS
CASCADE
FERGUS
MISSOULA
PETROLEUM
GARFIELD
JUDITH
BASIN
PRAIRIE
WIBAUX
POWELL
CLARK
MEAGHER
MUSSELSHELL
ROSEBUD
GRANITE
WHEATLAND
GOLDEN
RAVALLI
BROADWATER
VALLEY
FALLON
DEER
LODGE
SILVER
BOW
JEFFERSON
GALLATIN
SWEET
GRASS
YELLOWSTONE
TREASURE
CUSTER
STILL
WATER
POWDER
CARTER
BEAVERHEAD
PARK
BIG
HORN
RIVER
MADISON
CARBON
LEGEND
INTERSTATE NUMBERED HIGHWAY
2 U.S. NUMBERED HIGHWAY
20 STATE NUMBERED HIGHWAY
287 OTHER NUMBERED HIGHWAY
STATE OF
MONTANA
INTERSTATE, U.S. AND STATE
NUMBERED ROADS
HIGHWAYS

Figure 20.

RAILROADS

SOURCE

Board of Railroad Commissioners, Helena, Montana

KEY

- * Great Northern
- * Northern Pacific
- Chicago, Milwaukee, St Paul & Pacific
- * Chicago, Burlington & Quincy
- Union Pacific
- Minneapolis, St Paul & Sit Ste Marie
- Butte, Anaconda & Pacific
- * Montana Western
- United States Government
- White Sulphur Springs & Yellowstone Park

* Merged in 1970 to form Burlington Northern

** Amtrak

Fig. 21

Passenger service is limited to "Amtrak," which is a "semi-public" corporation comprised of stocks held by the railroads and federal government. Trains (Amtrak) are operated by the various railroads under direction of the corporation. In Montana, Burlington Northern operates two trains daily (one each direction), and six trains weekly (three each direction) for Amtrak along the northern and southern routes respectively, Figure 21 (Montana Economic Study Part II, 1970; J. Willard, 1972, personal communication).

About 5,000 miles of railroad, or approximately 7 miles/1000 population are in existence today.

3. *Airlines*

Four commercial airlines operate within Montana, Figure 22. Service is provided to 14 of the larger towns, and although somewhat limited, use has increased. Between 1950 and 1968, the number of enplaned passengers increased from 13,076 to 44,371. Approximately 86% of all boardings occurred in Billings, Great Falls, Missoula and Butte (Montana Economic Study Part II, 1970).

AIRLINE ROUTES

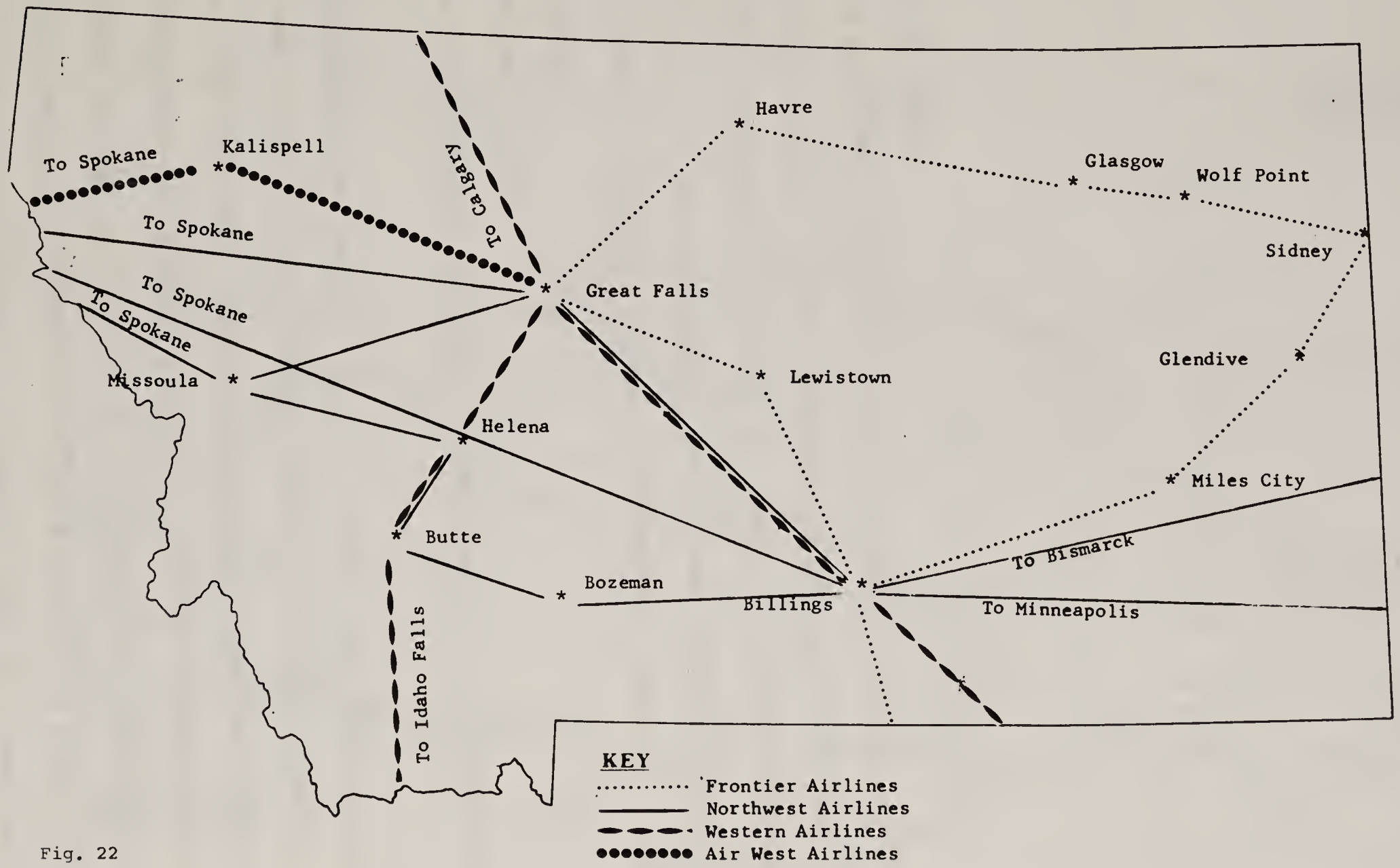


Fig. 22

IV. EVALUATION OF ENVIRONMENTAL IMPACT

EVALUATION OF ENVIRONMENTAL IMPACT

A. ENVIRONMENTAL IMPACT OF PROPOSED ACTION

1. *Air*

Increased use of various types of motor vehicles due to hunter activities cause some degree of air pollution. Added use of normal gas burning vehicles as well as 2-cycle propelled conveyances contribute foreign material to the air. Use of dirt and gravel roads in dry weather causes dust problems on a short-term basis. The actual significance of increased motor vehicle use by big game hunters to local or overall air quality is not known.

Campfires used by hunters create minor degrees of smoke pollution at local sites. Accidental fires caused by hunters could create major degrees of smoke pollution depending on the magnitude and circumstances of the fire.

2. *Soil*

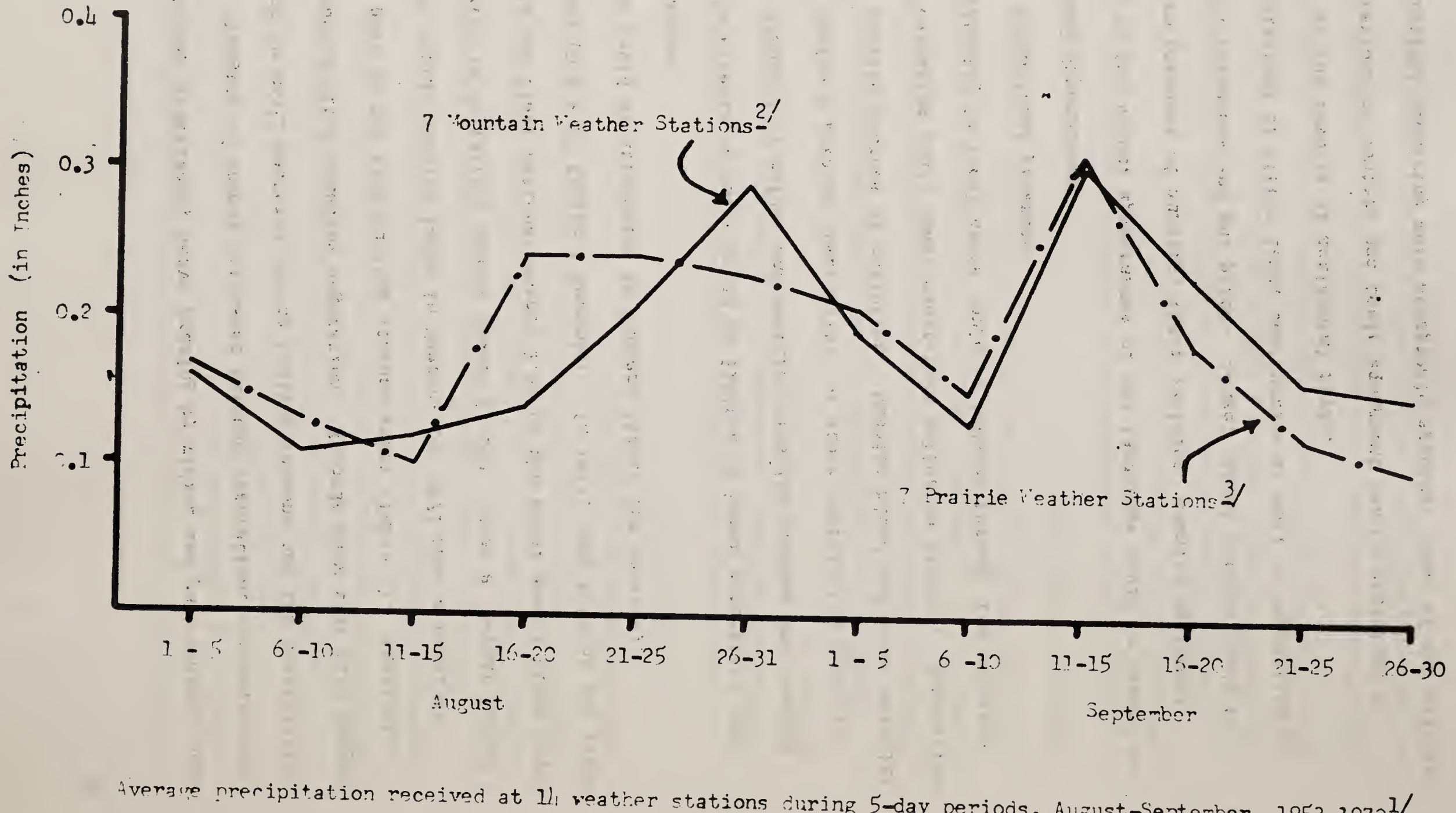
Impacts on soil result primarily through careless use of vehicles and riding and pack animals. Serious erosion of localized areas can be attributed to mechanical damage originating with mis-use of animals and vehicles. The degree of disturbance depends primarily upon the hunters tenacity in moving over the terrain to reach a desired location. Disturbance of the soil could cause erosion or allow invasion of undesired plants. The effects can be avoided or minimized through good hunter judgement, enforcement of existing regulations and through educational programs.

3. *Vegetation*

The impacts on vegetation result from use of vehicles and animals associated with hunting. Major sources include careless movement of

Table 9

1/ 1968 data unavailable.
2/ Includes: Butte, Darby, Hebgen Dam, Helena, Kalispell, Libby, Missoula.
3/ Includes: Billings, Broadus, Glasgow, Great Falls, Havre, Levistown, Miles City.



Average precipitation received at 14 weather stations during 5-day periods, August-September, 1953-1970 1/.

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vehicles through grasslands, heavy grazing by riding and pack animals near campsites, dragging of animal carcasses through vegetation, concentration of livestock in small pastures during hunting seasons and the possibility of hunter caused fires denuding vegetation. Records show that fire danger is usually past by the time hunting seasons start (Table 4). Statistics for the U.S. Forest Service lands in Montana for 1971 show a total of 674 fires with 24 definitely hunter caused (3.5%). Over a 20-year period on the Lewis and Clark National Forest 2.9% of the total annual fires were hunter caused (U.S.F.S. Region I Records). In 1971, only 0.6% of the fires on BLM lands could be attributed to hunters (State BLM Records).

4. *Water*

Possible effects on water would be limited to human activities such as careless disposal of refuse and vehicles crossing streams and causing siltation. Having a garbage dump, privy or stock corrals too close to water could provide sources of pollution. Washing blood and other material from animal carcasses could cause short-term pollution effects. Repetitive problems developing in local areas could be reduced through law enforcement and/or educational programs.

5. *Visual Appearances*

Effects on the visual appearances of the landscape could be caused by the short-term presence of hunters, their vehicles, camping equipment, horses, animal carcasses and gut piles. Longer visual effects could be caused by violations of litter laws, destruction to soil or vegetation by vehicles, or by the results of accidental fires.

Concentrations of hunters and their equipment can be minimized by camping regulations requiring more acceptable spacing. Most of the effects

of long-term nature can be reduced by education programs and enforcement of existing regulations.

6. *Sounds and Smells*

The primary sounds associated with hunting activity are the discharge of firearms, and vehicle noises. Lesser sounds would include animal noises, and various activities associated with hunting.

Smells most common would result from improperly disposed garbage and offal of game animals. Such smells are generally local and of short duration. Repetitive occurences could be curtailed through law enforcement and educational programs.

7. *Human Health*

Both benefits and possible adverse effects to human health can be expected during human involvement in outdoor activities such as big game hunting.

Hunting is a recreational activity that can provide both valuable physical exercise and mental relaxation to the participants and in general be beneficial. Combined with other outdoor sports it may help provide the only major physical exercise and mental relaxation for people in the more sedentary occupations.

Any use of firearms involves a certain degree of risk, both to the user and to those within firearm range.

Records of hunting accidents in Montana since 1959 showed 506 persons have been involved in sporting firearm accidents (Table 5). The fatality rate, 1959-1971 is 3.2 per 100,000 resident hunting licenses sold. In 1968, Montana's fatality rate was 1.3 per 100,000 license holders compared to 2 per 100,000 license holders nationwide (410 fatalities, 20.9 million

TABLE 5. Montana Hunting and Non-hunting Accidents Involving Sporting Firearms, 1959-1971.

Year	Hunting Casualties				Non-hunting Casualties			
	Fatal	Non-Fatal	Total	% Fatal of Total	Fatal	Non-Fatal	Total	% Fatal of Total
1959[1]	11	29	40	43	10	42	52	19
1960	6	27	33	18	15	44	59	25
1961	9	26	35	26	1	7	8	13
1962	9	33	42	21	2	3	5	40
1963	5	20	25	20	1	5	6	17
1964	5	13	18	28	1	9	10	10
1965	8	19	27	30	0	11	11	0
1966-67[2]	4	26	30	13	1	5	6	17
1967-68	6	9	15	40	1	15	16	6
1968-69	3	9	12	25	U N A V A I L A B L E			
1969-70	6	26	32	19	1	9	10	10
1970-71	1	13	14	7	U N A V A I L A B L E			
TOTAL	73	250	325	23	33	150	183	18

Year	Total Casualties			Total Resident and Special Hunting Licenses Sold	Fatalities: 100,000 Licenses
	Fatal	Non-Fatal	Total		
1959[1]	21	71	92	307,225	6.8
1960	21	71	92	310,336	6.8
1961	10	33	43	310,965	3.2
1962	11	36	47	315,780	3.5
1963	6	25	31	323,625	1.9
1964	6	22	28	302,447	2.0
1965	8	30	38	292,599	2.7
1966-67[2]	5	31	36	294,972	1.6
1967-68	7	24	31	300,755	2.3
1968-69	3	9	12[3]	229,695	1.3
1969-70	7	35	42	245,211	2.8
1970-71	1	13	14[3]	U N A V A I L A B L E	
TOTAL	106	400	506	3,233,610	3.2

1 January 1 - December 31 of each year, 1959-1965
2 May 1 - April 30 of each year, 1966-1971
3 Incomplete Data

licenses sold). Fatalities occurred in 21 percent of Montana's 1959-1971 accidents.

In a continuing and apparently successful attempt to reduce hunting-firearm accidents, the Montana Fish and Game Department and over 800 volunteer instructors have graduated 107,104 students in the Hunter Safety Program. As of December 31, 1971, Hunter Safety graduates represented 15.6 percent of Montana's total population. These efforts have been recognized by the International Association of Game, Fish and Conservation Commission's Award of Merit in 10 of the 11 years program records were submitted. In 1967 Montana received the Grand Award from this Commission for its outstanding program among all states and Canadian provinces sponsoring Hunter Safety Programs.

Certain afflictions to human health, including heart attacks, frost-bite, death from exposure, and other accidents may be suffered by hunters. While statistics are lacking for these human health problems, many are avoidable if the hunter embraces necessary precautionary measures. In the absence of hunting, a compensatory degree of similar effects could be expected in other outdoor recreations substituted for hunting.

There are possibilities of disease transmissions from big game animals to humans. We have no records of actual cases of human sickness from harvested big game animals.

8. *Wildlife*

It is not possible to evaluate the environmental impacts associated with big game hunting seasons without having considered the relationships of the animals to their environment. A discussion of these relationships is essential preceeding meaningful interpretation of hunting season impacts

both adverse and desirable.

Big game populations have the biological capability to reproduce their numbers to a level that exceeds the capacity of the habitat to provide forage and space. In Montana, the forage restriction has been most obvious during the winter season but of significance during other seasons as well. If population controls are not sufficient, the inevitable results are depletion of forage resources, extensive animal losses and lowered reproductive performance (production and survival of young animals). During the interval that excessive populations exist, the vegetation and soil resources can be and have been damaged to the degree that carrying capacity of an area is drastically reduced for infinite time periods. Lesser consequences include the loss of the animals, increased opportunities for depredation by game animals on man's domestic crops because of lack of native forage, and opportunity for forage competition with domestic livestock and other big game species.

The impact that big game populations can have on their ranges has been recognized and documented in numerous locations, world-wide as well as in Montana. Some examples of these documentations are summarized below.

In Arizona, on the Kaibab plateau (Rasmussen, 1941), a mule deer population, in the order of 100,000 animals insufficiently regulated, devastated vegetation on their range to the extent that carrying capacity was reduced to less than one-fifth of the original level. Large scale die-offs occurred in the population following range deterioration and insufficient forage.

An introduced population of reindeer on St. Matthew Island on the Alaskan Coast (Klein, 1968), totally unregulated by hunting, increased from an original population of 29 to 6000 in a period of 20 years. Following the initial introduction, populations responded to the high quality of the forage on the island by rapid increase through high birth rate and low mortality. By 1963, birth rates and survival of young had decreased sharply because of the high population density. Lichens, intitally a choice forage, had been completely eliminated and absent from the diet. In late winter of 1963-64, the population under went a die-off and dropped to 50 animals. The basis for the population crash was the depletion of the winter forage plants.

Big game malnutrition, starvation and range deterioration were recognized as problems on the northern Yellowstone elk herd winter ranges as early as 1892. The problem was complicated by many factors that restricted use of historical ranges (settlement of these lands and conversion to farms and livestock ranches). All hunting was prohibited in the Park by 1883 and controlled outside Park boundaries by the states. By 1914, the herd had multiplied to the point where the remaining winter range was stocked with about 35,000 elk. While malnutrition and some starvation had been observed each winter, during the winter of 1919-1920 about 14,000 elk died of starvation. During succeeding years, a variety of practices were employed to control the population within the park. The two primary means included direct reduction and transplanting of live animals. Once the capacity of the range was reduced, populations levels to date have not achieved those of previous dates. The history of this population clearly documents the potential for unchecked big game populations to destroy their ranges and materially reduce its capacity to support their own kind.

The history of the Gallatin elk herd and its relationship to habitat is well documented (Lovaas, 1970). Similar to the Yellowstone elk herd, the Gallatin herd has had a history of major disturbance by man including livestock grazing on ancestral ranges, settlement of range used by elk, removal of natural predators and inadequate regulation of population surpluses. The entire management picture has been complicated by the Yellowstone Park providing an unhuntable sanctuary for parts of the herd during some hunting seasons. Habitat was drastically deteriorated by overuse by the animals with range carrying capacity notably reduced. Several decades of management efforts have been required to reverse the downward trends in range and population condition. Means are not available to predict the time that will be required to restore the area to pristine condition. The problem could have been alleviated (at least to a major extent) by proper regulation of grazing animals.

Major mule deer winter ranges in Montana have been devastated (highly pronounced during the late forties and early fifties) by the lack of adequate population regulation. The same situation has occurred on numerous moose winter ranges throughout the State. It has occurred with elk populations in a variety of areas. The degree of occurrence on mountain goat and bighorn sheep ranges probably is equally significant though less well documented. Reasons for inadequate population control include lack of demand for the animal, disruption of natural habitats by man's cultural practices, control of natural predators, control of wild fires that can create habitat, and over-restrictive regulations resulting from sincere but misguided attempts to protect the animal while disregarding habitat

relationships. This type of thinking in part resulted from an era when game populations were exploited by the meat and hide hunters. People were, and continue to be, concerned with the numbers of animals they can see and disregard the habitat. Precise population numbers are not obtainable, but it is possible to measure the habitat and the effects of good habitat in terms of animal health. It has been repeatedly shown that reproductive performance of big game animals can be many times higher on healthy habitat than on poor habitat. Age ratio data for game populations throughout Montana verify this concept. Survival and condition of animals on poor range is not good. Those on healthy range are bigger, thriftier, the males have superior antlers and horns and are better animals in every respect.

In recognition of the impacts that big game populations can have on their environment, the Fish and Game Department has established numerous means of monitoring habitat, population and harvest relationships. At present, more than 1500 vegetation study plots have been established around the State on big game ranges to monitor condition and use of vegetation by game populations so that impacts on vegetation and soil are known. Population parameters are measured through use of standard survey techniques that provide information on population performance and trends. Harvest results of hunting seasons are recorded through use of field hunter check stations and by mail questionnaire surveys that provide data relating to the hunting seasons. Approximately 65,000 harvest questionnaires are mailed annually to persons hunting big game in Montana.

The information obtained from the aforementioned studies provides a basis for establishing hunting regulations that allow for maximum use of annual surpluses of game populations, that provide maximum hunting

opportunities for all game, and that enable balancing big game populations with existing forage supplies. Montana's game management program has been dedicated toward that end. Emphasis has been placed on big game because of the popular appeal of big game animals to sportsmen and the relatively large number of problems associated with maintaining widespread, sizeable big game populations. The hunter provides the only effective and economical means available to regulate game populations.

In many localities within the State, it has been possible to establish sustained management practices on big game populations. Antelope probably fit the concept more closely than other species because of ease of availability to the hunter. A major portion of the elk populations within the State are thriving, productive populations subjected to sustained population control through regulated hunting. The primary exception for elk include populations that spend parts of the season within areas closed to hunting (such as the Yellowstone Park and established game preserves) and cannot be taken by hunters at the time of the year that hunting is practical. Stevens (1966) documented the recovery of a moose range in southwest Montana following adequate population control. Sustained management practices have not been as effective with deer as with other species. To date, many of their ranges remain in deteriorated condition with no change in trend. The major benefits that hunting has provided in these instances is an opportunity to make use of at least some of the surplus animals and replace some of the mortality that would have occurred if hunting was totally absent. Improvement to existing situations on mule deer ranges can occur only through continued efforts toward adequate population regulation through hunting.

B. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

1. *Air*

The dust and exhaust from vehicles involved in hunting activity cannot be avoided. These effects will be short-term in nature and are not considered of major consequence with present levels of hunter participation. Hunter campfires in narrow mountainous valleys will create a local source of air pollution that will be difficult to remedy. If it becomes a problem of major order, it can be minimized or avoided by stringent regulation. It will not be possible to avoid all accidental fires. Records do indicate these to be a minor factor at the present time.

2. *Soil and Vegetation*

The major impacts associated with the soil and vegetation resources can be avoided or minimized through responsible education and enforcement programs. Localized damage will occur to both resources as the result of careless or uninformed persons. The major effects will include destruction or disturbance of the resources by vehicles, riding and pack animals. Fires have potential to denude vegetation which can create a significant adverse impact.

3. *Water*

It is anticipated that the adverse environmental effects of hunting seasons on the water resource will be short-term and generally insignificant. A possible exception could be stream siltation relating to soil and vegetation disturbance if such disturbance is severe and having long-lasting effects.

4. *Visual Appearances*

The presence of hunters, their vehicles, camping equipment, animal

carcasses and gut piles are not considered a significant adverse impact because of the duration of their presence. The effects of disturbance to soil and vegetation by hunter activity could present some long-term visual effects. Littering by hunters cannot be completely eliminated and provides an opportunity for some adverse visual appearances. Some types of litter will be visible for long periods--most can be removed if the visual impact is of significance to warrant such consideration.

5. *Sounds and Smells*

The overall sounds and smells of vehicles, firearms, and the general activity associated with hunting cannot be avoided. Smells relating to improper garbage disposal cannot be totally eliminated but can be minimized to acceptable levels through adequate enforcement of existing litter laws.

6. *Human Health*

Gun accidents, death due to excessive physical exertion, and other accidents are an adverse effect that is to some degree inherent in hunting recreation. Education efforts such as the Hunter Safety Program are showing success in reducing the gun accident rate. The other forms of death or injury can be influenced by education programs but will not be eliminated. The beneficial aspects derived from hunting recreation are substantially more numerous than the adverse effects (see: V. BENEFITS).

7. *Wildlife*

Hunting seasons provide for the removal of specified game animals by licensed hunters. In pursuing a particular animal, hunters on occasion bag other than the pursued species, or wound an animal that cannot be retrieved. This can be viewed as an adverse effect on the particular

animal or the animal population. It is not an effect of long-term consequences because of limited occurrence. Additionally, hunting seasons are established annually thereby providing opportunity for necessary harvest regulation. The high reproductive capacity of big game populations (previously discussed) prevents any long-term consequences in population reduction even if over-harvest did occur temporarily. The current season regulations and harvest levels are established with long-range goals in mind. The primary and most essential goal is maintaining suitable habitats. It is not anticipated that the proposed season will have any adverse effects on wildlife populations.

C. ALTERNATIVES

The only definite alternative to having a hunting season is not having a season. Variation of season lengths and bag limits constitute a modification but not an alternative.

It has previously been pointed out that big game animals have the capability to decimate their habitat if inadequately regulated. If big game animals are not regulated by some means, the ultimate result will be damage to soil, vegetation, watersheds and animal health. Other consequences include losses of animals, competition problems with other wild and domestic animals, depredation on domestic crops, loss of the recreation associated with hunting seasons, and the economic losses to the State.

The entire game management program is financed by the sale of hunting licenses and federal excise taxes imposed on sporting guns and ammunition. Closing of hunting seasons would eliminate this funding source, and would nullify opportunities for any effective management program. It is possible that a new funding system could be arranged, it is likely that the wildlife resources would suffer severely in this event.

Control of big game populations to maintain vegetative resources and reduce depredation to domestic crops in the absence of effective hunting seasons, has been approached by a variety of means. These means totally disregard any of the aesthetic values of game populations and are aimed solely at reducing numbers. Under existing laws and means of finance, the alternative control methods are totally impractical.

1. *Landowner Control*

The landowner is sometimes allowed by the Fish and Game Commission to harvest prescribed numbers of animals harming his economy. Attempts to control wild animals on his land without hunting seasons to harvest the major populations would be a full-time job and ineffective in most instances. Instances where this means has been used in Montana have been limited in number and have involved a small number of animals. The majority of landowners offered this opportunity to control depredation have refused.

Animal control by government hunters has been tried in various locations with varying degrees of success. Studies in New Zealand (Daniel, 1966) indicated that large concentrations of deer on open clearings and in forest edges can be effectively reduced by use of 1080 in carrot bait. The technique was considered very unlikely as a substitute for hunting as an economical means of control. The probable success could be likened to coyote control by the Bureau of Sport Fisheries and Wildlife, where they have not succeeded in eliminating the coyote. The effect of control has been to crop off the surplus and form a healthy, stable population similar to what we strive for in big game populations.

2. *Poison Baits*

Distribution of poisons to control or eliminate wild game animals is

a possibility. It would be unpalatable to most and beyond comprehension by a great majority of Montana's citizens. Recent congressional action restricting poison for predator control illustrates the acceptability of such programs by the public.

3. *Trap and Transplant*

Trapping and transplanting as an alternative to harvest is biologically and economically impossible. It is a method used to introduce or re-establish certain species to new or previously occupied habitats. Currently most animals would have to go out of State as most available habitat is filled to capacity. Large scale in-State transplanting of big game species merely results in moving animals from one problem area to another.

Today, through management the need for wholesale transplanting has been eliminated. A few minor transplants of elk, goat and sheep are still done annually or periodically, but the numbers involved are very small.

4. *Biological Control*

Sterilization of game animals through injection with drugs theoretically could reduce or eliminate reproduction so populations could be maintained without hunting. Means of immunizing the animals to prevent conception or successful parturition would be impossible unless extremely large sums of money and manpower were available. If there were no hunting licenses sold, there would be no income from the hunter to accomplish and administer such an undertaking, financing would necessarily have to come from the general public. Any method used to introduce the control material would require general distribution through food, conceivably insect transmittal. This

means of distribution could infect domestic animals or wild animals that are not the intended target.

Introduction of disease vectors or parasites to sexually incapacitate or destroy specific wild game species is possible. It is hoped all people are spiritually above condoning control in this manner.

The introduction of large predators to control wild animal numbers has been discussed. Most areas inhabited by big game are near civilization, therefore totally unsatisfactory as habitat and incompatable with man's activities. Information relating to large predators in Montana, indicates little influence on population regulation on any of the big game species. An intensive analysis of mountain lion predation on mule deer and elk in an Idaho primitive area indicated that elk and deer populations were limited by the winter food supply, and that predation by lions was inconsequential in determining ultimate numbers of elk and deer (Hornocker, 1970).

The control options, though inadequate, were considered in light of some maintenance of animal populations in relation to habitat capacity and man's uses of the lands. An additional option under a no-season alternative would be to allow the natural biological processes to occur. This has occurred in numerous instances and the results in terms of habitat and big game populations have been discussed. This option has absolutely no practical application if a concern is maintained for perpetuation of the soil, vegetation and big game resources.

D. SHORT-TERM LONG-TERM USE

No long-term effects on the environment are expected. The short-term effects have all been discussed (under section A. Environmental Impact of Proposed Action). No long-term effects on big game populations are expected

if harvest levels are maintained within the biological limits of the species. The most pronounced long-term environmental impacts that could result, would be those associated with decimated habitat that would take place if adequate regulation of animal numbers is not maintained.

E. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Big game populations are renewable resources whose future depends upon the quality and quantity of habitat available to each species. Current knowledge does not indicate that present levels of harvesting game animals will cause any irreversible or irretrievable commitment of resources. Again, irreversible damage can result if responsible management and regulation of big game numbers is not accomplished.

F. DISCUSSION OF PROBLEMS AND OBJECTIONS BY OTHER AGENCIES OR THE PUBLIC

The general public has various misunderstandings about wildlife ecology, population dynamics and the relationships of hunting. Problems of public understanding of wildlife management principles are reviewed by Allen (1954: 293-308). Considerable progress has been made by Montanans in understanding resource management. What was commonly recognized as an annoyance or problem at one time is understood as an environmental consequence today. This recognition has been influenced by an involvement of concerned segments of the public and through more responsible resource legislation. Some of the problems that will be discussed below have previously been dealt with under section A.

PRIVATE PROPERTY OWNERS

1. *Season Structure*

A variety of complaints are made by landowners relating to the structure of the season, the length of season, the dates it opens and closes. Some

prefer having no hunting season at all. Others would like a special season to deal with a local situation. Landowners commonly request control of big game populations on their lands but do not want hunting seasons. Others would like to see special closures to the public at large enforced by the Fish and Game Department but open to them or guests. Hunting seasons cannot practically be adjusted to accomodate each individual landowner and accomplish the resource management objectives of a season. They must consider broad land forms and problem areas to prevent total confusion to the hunting public. Current management units are designed with the total management objectives and specific problems in mind. The variation in viewpoint in local areas prevents formulation of a season acceptable to all people even if management objectives were diluted.

2. *Disturbance or Nuisance*

The disturbance type problems have no long-lasting consequences and relate primarily to inconsideration on the part of individual hunters. Problems include hunters awaking the landowner at odd hours to obtain permission to hunt, harrassing of domestic livestock, disrespectful conduct on the part of hunters, hunting without permission and the general nuisance associated with hunter activity. These problems can be lessened by educational efforts by interested sportsmen's groups and the Fish and Game Department. Descriptive signing of property by landowners also can do much to alleviate annoyance both to the landowner and the hunter.

3. *Environment Disturbance*

Landowners are concerned with littering of the landscape by the hunter, starting fires and disturbance to soil and vegetation by careless use of vehicles and horses. These problems have been discussed in detail under

evaluation of environmental impacts.

4. *Property Damage*

Loss of livestock to the careless hunter is a common complaint received from stockmen. The magnitude of this loss is not precisely known. Detailed investigations of such losses have not demonstrated all reported losses were hunter caused. Investigation also has revealed some exaggeration in the reporting. Distruction of property, shooting up mail boxes, signs and buildings does occur. Precise data relating to the magnitude is not available. Hunters do leave gates open and allow mixing or movement of livestock, requiring effort and expense by owners to gather them.

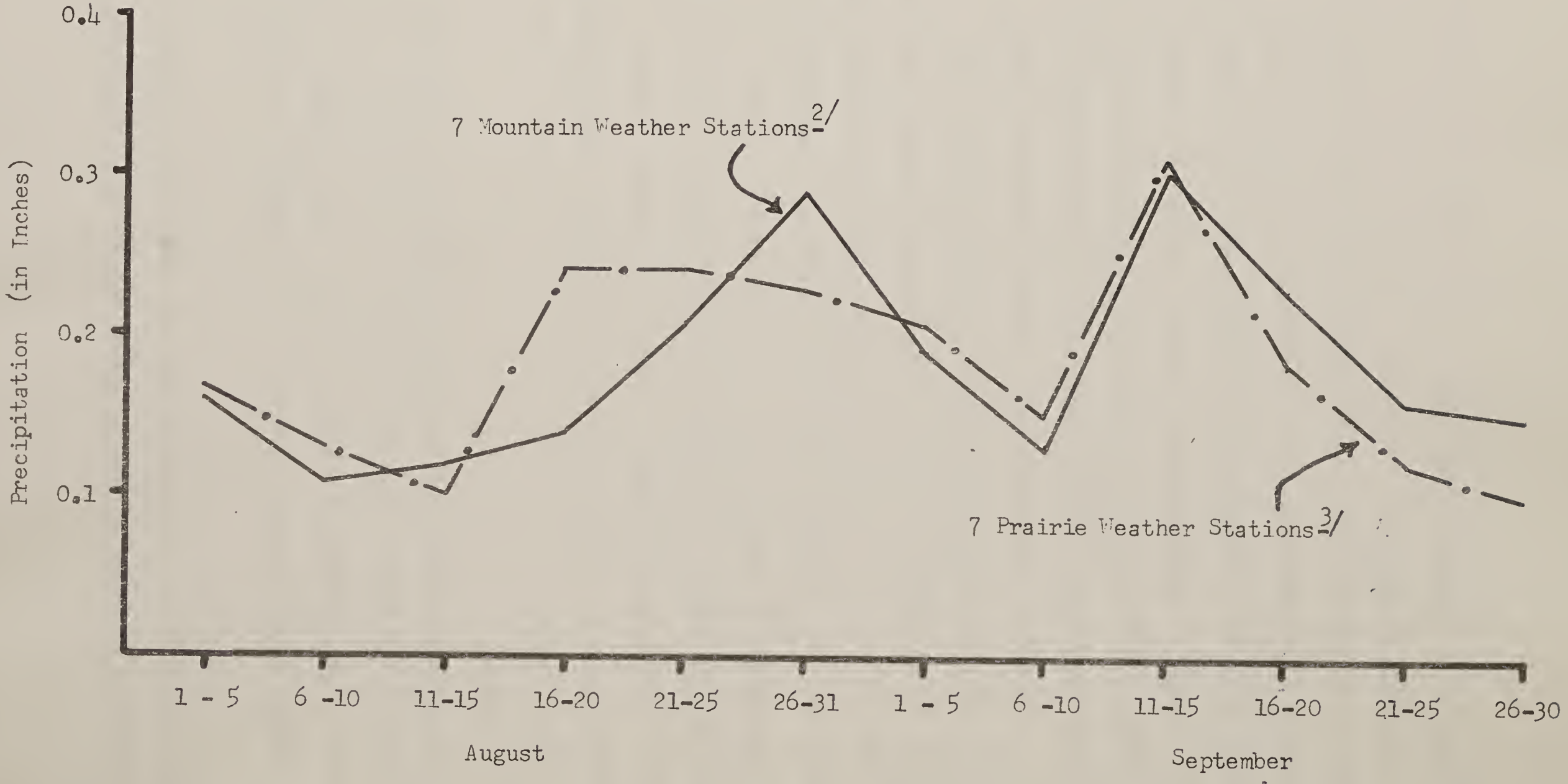
Most of these problems could be corrected by combining laws relating to public use of private land under a single statute with greatly simplified provisions. In instances where specific property damage has been done, effort by the property owner to file a complaint would serve to discourage such activities by others. The hunter must also realize that through his responsible actions in apprehending violators of property damage laws he is furthering his own cause and that of the landowner. The same principles apply on public lands.

RECREATIONAL HUNTER

The recreational hunter has a variety of views as to a desirable season, however, the majority are interested in as much hunting opportunity as is possible. The variety in viewpoint ranges from interest in early bull elk seasons during moderate weather to late seasons with adequate tracking snow.

Within the group of recreational hunters, there are a number of special interests relating to means of taking game animals. These include primitive

1/ 1968 data unavailable.
2/ Includes: Butte, Darby, Hebgen Dam, Helena, Kalispell, Libby, Missoula.
3/ Includes: Billings, Broadus, Glasgow, Great Falls, Havre, Lewistown, Miles City.



Average precipitation received at 14 weather stations during 5-day periods, August-September, 1953-1970 1/.

firearms and bow and arrow. General rifle hunting seasons are viewed as incompatable with the special weapon hunts by these participants.

Recreational hunters have displayed strong interest in obtaining access across private holdings to public lands. Lack of access to public lands, both State and Federal, has compounded hunter congestion problems on private holding within some areas of the State.

COMMERCIAL OUTFITTERS

As with the recreational hunter, the commercial outfitter is interested in as much hunting opportunity as is possible. Their interest is commonly directed toward trophy type hunts for large male animals. This attitude and interest can intensify big game management problems in areas where access to game populations is limited. Outfitters encounter similar problems as the recreational hunter in obtaining access across private lands to public lands.

ANTI HUNTER

There are people that have objectional views toward any form of hunting season--the anti-killers. Factually, these people contribute less to the welfare of wildlife populations than any segment of society. Most take life in at least some form for their own survival, or survive by utilizing products that others have killed or processed. At the present time, this problem is of limited consequence to hunting in Montana, however, the spreading of such attitudes could result in serious resource deterioration if it ultimately influenced big game management.

LAND MANAGEMENT AGENCIES

Many of the problems encountered by private landowners would similarly pertain to public land managers, including the Fish and Game Department.

These problems are adequately discussed under the preceeding sections.

CONFLICT WITH OTHER LAND USES

Direct conflicts can result when hunting seasons are opened on lands having other high intensity uses. The magnitude of these conflicts cannot be determined without dealing with special situations. Virtually any type of overlap could be viewed as a problem by some individual or group. Conflict could occur on recreation areas; livestock grazing on public lands during hunting seasons is viewed as a problem by the hunter, the stockman views the hunting season as a problem.

Closing of the hunting season does not provide a worthwhile solution to landuse conflicts. Such action eliminates the opportunity for responsible law-abiding recreationists to participate in an enjoyable form of recreation. It eliminates opportunity for responsible management of a renewable resource. It further provides opportunity for conflicts with big game populations with domestic crops (depredation) and/or forage resource conflicts with other animals both wild and domestic.

OTHER PROBLEMS

The total complex of problems or complaints associated with hunting seasons are numerous. Many of these have no substantial environmental consequences and are not unique to any particular group or population segment, some of these problems are discussed below:

1. That hunting seasons tend to remove vulnerable road-side animals, making observation of animals more difficult.
2. Many people object to seeing animal carcasses, gut piles, and wounded animals.
3. Some people feel hunting harrasses game animals, disrupts breeding behavior and orphans young of the year.

The previous points (1-3) do occur to varying degrees when hunting seasons are in progress. Most people are not fond of crippling or wounding an animal and make sincere efforts to obtain clean kills. Gut piles and animal carcasses are a part of a hunting season that cannot be dispensed with. Hunter harrassment of animal populations has not been demonstrated to be of significance in influencing breeding behavior. The degree of mortality of young because of orphaning is minimal in game populations that are on healthy seasonal ranges. The young of the year are physiologically developed by the beginning of the hunting season to the extent that they are capable of self survival. This concept has been well established by high survival rates in numerous big game populations in Montana.

The major segment of the hunting public does not spawn irrevocable consequences on land form or on property owners. Most pursue the sport with an attitude of responsibility and integrity to both. There commonly tends to be an attitude expressed toward undesirable acts of, "Penalize the masses for the acts of a few." This attitude does not provide meaningful solutions to the problems that do exist. Laws should provide means to assess substantial penalties against those committing acts of vandalism or property destruction. It should not be necessary that the landowner or property owner be totally responsible for apprehension. Present day laws, requiring permission for trespass, impose penalty for trespass and accomplish nothing along the lines of property damage. Trespass in itself is of no consequence to the environment and of very major consequcence to the property owner. The hunter leaves a very insignificant impact on the land as a result of walking into an area and bagging a game animal. The major problems result from his vehicles, or from the negligence

of the periodic hunter. Efforts need be directed toward correction of the specific problems, not toward blanket regulation against the entire hunting population. Specific problem situations can best be rectified by specific rather than general regulation.

V. BENEFITS

BENEFITS

Hunting is a deep rooted and traditional human activity which over the years has changed from one of necessity and survival to one of recreation and sport. While the motives have changed, hunting popularity has grown and participation has been increasing (USDI, 1966 and USDI, 1970) and involves a significant portion of the U.S. population. In 1968 approximately 14.9 million Americans hunted, purchasing a total of 20.9 million hunting licenses (USDI, 1970). In 1965, 25 percent of all males between the ages of 16 and 34 were hunters (USDI, 1966).

To attract this large following, the satisfaction derived from hunting must be somewhat special or unique. Hunting is not a casual activity and often requires special and expensive equipment. The benefits of big game hunting can be placed into four general categories: 1) the satisfaction as fulfillment to hunters' desires; 2) the economic impact stemming from expenditures by hunters; 3) the environmental benefits derived by regulating big game populations to levels commensurate with existing habitat; 4) assuring the perpetuation of big game populations through acquisistion of critical habitats made possible by revenue obtained from hunter dollars.

People hunt for a variety of reasons. Probably most important is the recreational aspect--that is, the value of relieving the monotony and strain of today's pace of living and restoring a capacity to return to one's work with new vigor and dedication.

Hunters benefit physically from the fresh air, exercise and relaxation in the out-of-doors. A considerable portion of a hunting trip is the aesthetic enjoyment of the out-of-doors in the company of congenial companions. The pursuit of game also presents a challenge which appeals to

the competitive nature of people, and allows them an opportunity to satisfy an urge to pursue and attempt to kill in a manner not destructive to society. In other words, hunting provides a legitimate outlet for primitive emotions.

To the observant person, hunting can be an educational activity, in that it presents the opportunity to observe living things in relation to each other and to their environment, which is the science of ecology.

Hunting is a character-building experience. Pursuit of game in observance of regulations breeds respect for hunting regulations and laws in general. Contact with landowners or land managers makes hunters aware of other people's problems and fosters respect for property rights, thereby decreasing the potential for vandalism.

A 1965 hunting survey in Arizona showed 37 percent of the hunters interviewed hunted for recreation (Davis, 1967). Most hunters started hunting before the age of 20 and felt the special skills required to successfully meet the challenge of hunting helped develop the desirable traits of patience, perserverence and moderation (Davis, 1967).

Miller and Powell (1942) suggested that recreational, social and aesthetic values of wildlife greatly exceed its economic value. These are intangibles that are difficult to recognize and usually even more difficult to evaluate. A committee of the National Academy of Sciences ("Land Use and Wildlife Resources," 1970) state that the value of a recreational asset or experience might be high or low, depending on the extent to which it safisfies a social need. Determining a degree of satisfaction would be difficult; assigning it a value would be even more difficult. Wildlife (and hunting), like good public health, is a social asset which cannot be

equated to dollar values. Placing economic values on this social asset could lead to under estimating the elusive but much greater social values (NAS 1970).

For intangible benefits received, hunters are willing to pay for their hunting experiences, and thus provide economic benefits to others. While willingness-to-pay is not an estimate of true worth, it is useful as an indication of minimum worth. In 1968 the nation's hunters spent 1.1 billion dollars; license fees accounted for only 6 percent of that total (USDI, 1966). Expenditures by hunters can be the life blood of local economies.

The economic benefits of hunting are many and varied. The value of the meat from big game taken by hunters is considerable, plus other products such as buckskin, rugs, and trophies. Hunters' expenditures probably represent a truer picture of the economic value of game animals. Economic surveys have shown that hunters spend millions of dollars in the enjoyment of their sport. These expenditures for sporting goods, transportation, food, lodging and guides make each big game animal taken worth hundreds of dollars, and contribute to the livelihood of many people.

In 1960, 146,570 Montana hunters spent an estimated $22.7 million, an average of $150 each, or $13.50 for each hunting day (McConnen). A 1968 survey of hunter expenditures in Colorado indicated that each bagged big game trophy was worth several thousand dollars to the State's economy (Nobe and Gilbert, 1970). A 1971 survey of the value of outdoor recreation in the Gallatin Canyon of Montana showed that elk hunters spent $1,087 for each elk bagged (Picton, 1972). A 1971 hunter survey in hunting district 319, southwest of Butte, Montana, conservatively estimated that more than $500 was spent to bag each big game animal (Cole and Ormiston, 1972). More than

130,000 big game animals were bagged in Montana during the 1971 hunting season. The economic impact of hunting must be felt to a certain degree in every community.

There are also several positive economic aspects that are not included in any of the figures previously listed. They do not include any secondary benefits, but only primary expenditures by hunters. A secondary economic benefit is the cost of providing a service which is purchased by a hunter. There are many hunters, mostly young ones, who do not hunt game animals and are unlicensed. They spend many hours and a few dollars hunting non-game species. Hunting also effects a certain number of people who are non-hunters; friends and relatives who just go along for the outing. In Arizona, nearly one-third of all small game hunting trips included unlicensed people and involved more than half a million people (Davis, 1967). The expenditures of these non-hunters while on the trip are the result of hunting and should be considered in an economic survey.

The thousands of pounds of game meat have a definite monetary value, especially to chronic low income families.

Hunting is beneficial to the hunted species by preventing over-population. An uncontrolled population tends to increase beyond the carrying capacity of the range. Animals deplete their food supply, become under nourished, diseased, and many starve to death during winter. Fewer young are born, many die after birth and more fall victim to predators.

From a humane aspect alone, it is preferable to control game populations by hunting, than by nature's way, which is often starvation.

The environmental benefits of hunting lie in prevention of damage to plant life and soil by big game animals. Herbaceous plants, shrubs and

young trees are vulnerable to grazing, browsing and trampling. Excessive numbers of deer, elk or other big game on limited ranges damage plant life and even the soil to the point where recovery requires many years. Water quality may be damaged by soil run-off from deteriorated game ranges. Controlling game populations by hunting assures a more pleasant and productive environment.

One of the major benefits to Montanans associated with hunting seasons is the acquisition and development of key habitats for game animals that has been possible through funds acquired from sportsmen's dollars. These funds are acquired by the sale of game licenses and from federal tax assessed against sporting arms through the Pittman-Robertson Act. These are the only sources of funds available for acquisition of wildlife habitats. Cash payments in lieu of taxes are made to all counties in which these lands occur. The Fish and Game Department is the only State agency which makes such payments on State owned lands.

Most of the major acquisitions have been for winter elk ranges located in the foothills and valleys of westcentral and southwestern Montana where much of the primary big game winter range is located on private lands. In addition to the values to elk, other big game animals, upland species and fish derive benefits from the acquisition of lands critical to survival of big game populations. These lands have served to alleviate game damage and game-livestock forage competition problems and allowed the development of game populations which otherwise would not have been tolerated on private holdings or possible because of limited forage. The Bear Creek, the Beartooth, the Blacktail, the Blackfoot-Clearwater, the Gallatin, the Judith River, the Haymaker, the Wall Creek and the Sun River Game Ranges are the

major elk winter areas. In addition, the Freezeout, Ninepipes and Pablo waterfowl areas are major developments in Montana. In addition to the habitat values obtained with these acquisitions, all areas provide places for Montanans to hunt, fish, picnic or find general recreation. In many cases these areas also provide access to other public lands that would not be available to the public.

VI. SUMMARY STATEMENT

SUMMARY STATEMENT

The intent of this environmental impact statement is to examine possible effects of big game seasons on the environment in Montana, to explore reasonable alternatives and to make the information available to the public.

Harvests of big game animals are accomplished by annual hunting seasons regulated by the Fish and Game Commission under authority by law (section 26-104), Montana Fish and Game Laws. The specific authority of the commission is discussed. Information on season types, license requirements and hunting regulation are presented. The existing resources relating to the welfare of big game populations and hunting seasons are described.

The major environmental consequences that can occur as the result of hunting seasons are those associated with misuse of vehicles, in particular, disturbance of vegetation and soil. The possibility of fires associated with hunting activity is considered. Existing records indicate fire danger to be low by mid-September, at which time some of the earlier big game seasons open. Ample authority is available to heads of state to contend with extreme fire danger if it exists.

Smoke from campfires, increased traffic and use of camp grounds, noise, littering and temporary pollution of water under local circumstances are consequences of short-term nature that are associated with hunting seasons. It was concluded that the major portion of these activities will have no significant impacts on the environment. Existing laws provide

opportunity for dealing with specific situation of significance.

Gun accidents, death due to physical exertion and poor judgement on the part of hunters are adverse effects on the human resource that can not be eliminated. The beneficial aspects of human health derived from hunting recreation substantially out weigh the adverse factors.

The most pronounced environmental impact that can be associated with big game populations and hunting seasons, is the decimation of habitat that occurs when big game populations are not regulated. Big game populations are renewable resources whose future depends on the quality and quantity of habitat available to the species. Current knowledge does not indicate that present levels of game harvest will cause any irreversible or irretrievable commitment of resources.

The benefits derived from big game hunting include: 1) the satisfaction hunters obtain physically and mentally from pursuing a game animal; 2) the economic impact stemming from expenditures by hunters; 3) the environmental benefits derived by regulating big game populations to levels commensurate with existing habitat; 4) assurring the perpetuation of big game populations through acquisistion of critical habitats made possible by revenue obtained from hunter-dollars.

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